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Patti Ensel Bailie

University of Nebraska-Lincoln, pattibailie@mac.com

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CONNECTING CHILDREN TO NATURE:
A MULTIPLE CASE STUDY OF NATURE CENTER PRESCHOOLS

by

Patti Ensel Bailie

A DISSERTATION

Presented to the Faculty of
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Major: Interdepartmental Area of Educational Studies
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Under the Supervision of Professor Carolyn Pope Edwards

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CONNECTING CHILDREN TO NATURE:
A MULTIPLE CASE STUDY OF NATURE CENTER PRESCHOOLS

Patti Ensel Bailie, Ph.D.

University of Nebraska, 2012

Adviser: Carolyn Pope Edwards

Environmental degradation, childhood obesity, and aggression of youth are societal problems that appear unconnected. However, their cause (and possible solution) may be linked to a common experience – the amount and quality of time spent in the natural world. Environment based education, significant life experience research, and studies involving urban youth and green spaces have shown that children's experiences in the natural world have a positive effect on their attitudes, behaviors, and environmental awareness. Nature center based preschools are one approach for connecting children and nature, but little is known about the quality and consistency of their practices. This study explored program practices at preschools located at or operated by American nature centers. The purpose of this qualitative multiple case study was to describe how these preschools integrate child development and environmental goals in teaching young children. Data collection included semi-structured interviews with eight nature preschool directors, observations of their classes, and review of their documents. Data were analyzed within case and across cases to better understand how the preschool directors create and implement curriculum and to find similarities and differences among the programs. A major finding of this study suggests that the combination of early childhood education and environmental education is more powerful together than each by itself.

Nature preschool goals address *both* the developmental needs of young children *and* their biophilic tendency to focus on the natural world. High quality practices for nature preschools emerged, suggesting that a nature-focused curriculum can include both developmentally appropriate practices and environmental literacy and learning, but staff education and training is crucial for providing an excellent program. No professional standards exist today for nature preschools. Recommendations include developing quality standards for nature preschools and establishing an association or network for early childhood environmental educators.

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DEDICATION

To my husband Bob for his constant support and loving playfulness.

To my son Andrew for his continuous encouragement and inspiration.

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CHAPTER 1 INTRODUCTION

Introduction

This study seeks to explore program practices and experiences at nature center based preschools in the United States. The purpose of this multiple case study is to describe in what ways nature center based preschools in the United States integrate child development and environmental goals in teaching young children. It is anticipated that the knowledge gained would help to identify elements of quality practice for nature center based preschool programs. This research employed qualitative multiple case study methodology to illustrate the programs under examination and to discover the similarities and differences in practices and experiences among them. Participants of this study include a purposefully selected group consisting of eight nature preschool directors.

This chapter begins with a description of the case, nature center based preschools. Following this are the problem statement, the statement of purpose, and accompanying research questions. Also included in this chapter is discussion about the research approach, my perspectives and assumptions, limitations, and delimitations of the study. The chapter concludes with a discussion of the proposed rationale and significance of this research study, definitions of some of the key terminology used, and organization of the study.

Nature Center Based Preschools

Imagine a preschool where a group of four and five year olds jump into a pond and begin to catch frogs. They've come from a natural wooded play area that opens out to

a boardwalk adjacent to the pond and next to the preschool building. The children know where to walk and where the water is not very deep. When they get to the edge of the shallow water they stop. They have the freedom to explore and are excited about catching frogs. They are prepared, wearing boots and rain pants. It is apparent that they have done this activity before, as they know where to go and what to do. Instead of being told to stay out of the pond, their teacher asks one of the children to get her boots, too. The teacher is supportive of their exploration. She lets them figure things out and asks questions to help them problem solve the best ways to sneak up on the frogs and still stay safe. This example of an emergent curriculum is explained by the teacher:

This morning I had not planned on going over to the pond and getting wet...The kids...were finding toads in the back area then they wanted to...find frogs... Why can't they just jump over the edge? They've got their boots on. They know where they can walk. We've been working on this for weeks...[and they have a] sense of ownership and...confidence [that is not often seen in children this young].

The children described above attend a nature center based preschool. This program is the ultimate bridging of the early childhood and environmental education fields. The nature-based preschool is a state licensed preschool for three to five year olds, housed and/or operated by a nature center or environmental education center. In this setting children have the opportunity to visit different habitats on a daily basis. Early childhood educators work with environmental educators to provide a nature-based curriculum. Because of the nature focus the curriculum is often emergent, where the activities come from the children's interest, because it is based on what is happening

outside and how the children respond to these changing environments. It also provides authentic experiences, such as interacting with animals and natural materials, because the children experience the topics through their senses and can see, touch, smell, and hear everything that is discussed. Nature activities often include catching insects, following animal tracks in the snow, maple sugaring, planting trees, observing animals at the pond, and unstructured play in natural play areas (Bailie, 2010).

Experiences like the one described above are commonplace at a nature preschool. These activities in the natural world combine with developmental goals as the children become more confident and independent, even learning self-regulation skills as they explore the pond. Cognitively they are learning about frogs and their behavior. Physically they are developing large motor skills as they maneuver through the pond and surrounding land bordering the pond, and fine motor skills as they attempt to catch the frogs with their hands. Spending time in the wetland will have a cumulative effect on their awareness of the environment.

However, other than at a nature preschool, these types of experiences in the natural world are becoming a rare occurrence for young children in the 21st century.

Statement of the Problem

Our world is experiencing detrimental and preventable environmental and health-related concerns as well as other critical issues that affect children and society.

Environmental degradation resulting in global warming is threatening the life of our planet and our species (Gore, 1992; Orr, 1994). The increase in obesity of our population threatens health related problems like diabetes (Center for Disease Control, 2007). Other

critical issues that effect children have been on the increase such as Attention Deficit Disorder and school violence (Burdette & Whitaker, 2005; Louv, 2005/2008). Environmental degradation, childhood obesity, and aggression of youth are societal problems that appear unconnected. However, their cause (and possible solution) may be linked to a common experience – the amount and quality of time spent in the natural world. Current trends seem to indicate that the number of these early outdoor experiences has been diminishing (Louv, 2005/2008; Rivkin, 1998).

Children's experiences in the natural world have been decreasing over the past twenty to thirty years. A generation ago more children spent time exploring the forests, climbing trees, and building forts. In the past 20 years children's outdoor activities have become more organized (generally related to organized sports) and have lacked the spontaneity and positive connection to the natural world (Hofferth & Sandberg, 1999). Whether, or not, this trend is caused by technology, traffic, or the fear of strangers, the fact remains that fewer children have the access to nature and the ability to explore on their own than did their parents and grandparents (Clements, 2004; Ginsburg, 2006; Hofferth & Curtin, 2006; Mendoza, Zimmerman, & Christakis, 2007).

This decrease in nature play and lack of connection between children and the natural world may also pose a risk to human development and the growth of future conservationists. Robert Michael Pyle (1993) in *The Thunder Tree* refers to this loss of connection to the natural world as “extinction of experience...[that] implies a cycle of disaffection that can have disastrous consequences... [When] citizens grow more removed from personal contact with nature, awareness and appreciation retreat. This breeds apathy for environmental concerns” (p. 146). Richard Louv (2005/2008) in *Last*

Child in the Woods, coined the term “nature deficit disorder” to reflect “the human costs of alienation from nature, among them: diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses” (p. 36).

Environment based education, significant life experience research, and studies involving urban youth and green spaces have shown that children’s experiences in the natural world have a positive effect on their attitudes, behaviors, and ecological appreciation. Research provides increasing evidence that there is a positive effect from spending time in natural areas on young children as they develop, on their health, academic performance, and environmental awareness (Chawla, 1999; Faber Taylor & Kuo, 2006; Kuo, Bacaicoa, & Sullivan, 1998; Louv, 2005/2008; Tanner, 1980; Wells, 2000; Wells & Lekies, 2006). Studies also suggest that being in the natural environment can reduce aggression and crime in urban settings (Kuo & Sullivan, 2001a, 2001b) and may positively affect a child’s ethical development and behavior (Damasio, 1994, 2003).

“We relate to the environment around us in different ways, with differing intensity, and these bonds have different sources. At the most common level, we learn to love what has become familiar” (Orr, 1994, p. 137). Nature preschools at environmental education centers present one way to offer frequent, positive nature experiences to young children, providing an opportunity for them to become familiar with the natural world. Although there is anecdotal information describing the benefits of a nature curriculum for young children (Bailie, 1999; Woyke, 2004), there have been few, if any, research studies evaluating nature preschools, their curricular elements, and the effect they have on the children that attend. Nearly 20 nature center based preschools have been identified in the United States, varying in size (number of classrooms) and age of the preschool (Bailie,

Bartee & Oltman, 2009). Although there is research on the benefits of nature experiences for children, nature center based preschools have received little or no in depth studies. Just because a preschool says it is a nature preschool, is it? What makes it a nature preschool and what are the minimum requirements or standards that ensure it is providing high quality early childhood environmental education (ECEE) (Larimore, 2011)? Nature center based preschools may be one solution to reconnect children and nature, but little is known about the quality and consistency of their practices.

The North American Association for Environmental Education (NAAEE) published *Early Childhood Environmental Education Programs: Guidelines for Excellence* in October of 2010. These were the first comprehensive guidelines attempting to combine high quality practices in early childhood education with high quality practices in environmental education. Although these guidelines were developed with a committee of early childhood educators and environmental educators, they have not been tested at nature preschools.

Statement of Purpose and Research Questions

The purpose of this multiple case study is to explore, with a sample of preschool directors at nature center based preschools in the United States, how these preschools integrate child development and environmental goals in teaching young children, and to identify and describe high quality practices among the programs. At this stage of the research, a nature center based preschool will be generally defined as a state licensed preschool for 3-5 year olds housed at or operated by a nature center or environmental education center.

Of specific research interest are the directors' goals for the program and curriculum, what informs the program and curriculum (e.g., preschool methodology, environmental education, mission of the nature center, theories of child development, and director's background), and what impacts the program and curriculum (e.g., parent expectations, kindergarten readiness, teacher qualifications and experience, nature center policies and expectations, and physical space).

This study builds on the findings of previous work I have done to ascertain the state of nature-based preschools in the United States (Bailie et al., 2009). To shed light on the problem the following research questions are addressed:

1. In what ways do nature center based preschools integrate child development and environmental goals in teaching young children?
2. What do high quality practices in nature center based preschools look like, and are they consistent across programs?
3. How do directors in nature center based preschools incorporate elements of quality practice in their programs?
4. What goals do directors of nature center based preschools have for their program and curriculum, and how do these inform the environment and experiences they provide for the children?
5. What informs the program and curriculum (e.g., preschool methodology, environmental education, mission of the nature center, theories of child development, and director's background)?

6. What impacts the program and curriculum (e.g., parent expectations, kindergarten readiness, teacher qualifications and experience, nature center policies and expectations, and physical space)?
7. What can be learned about teaching and learning from nature center based preschool programs?

Research Approach

With the approval of the University of Nebraska – Lincoln Institutional Review Board, I studied nature center based preschool programs by interviewing eight nature preschool directors. The primary method of data collection were in-depth interviews; that focused on program goals, curriculum, teachers, parents, community, physical environments (inside and outside), nature center, and the directors' backgrounds. The information obtained through the eight individual interviews subsequently formed the basis for the overall findings of this study. Each interviewee was identified by a pseudonym and all interviews were recorded and transcribed verbatim. In order to triangulate the data, two other data collection methods were used; observation of the preschool classes and analysis of preschool documents (e.g., parent manuals, written curriculum, preschool newsletters, and other documentation that was available from the director), in addition to the interviews. This investigation used multiple case study methodology, incorporating a qualitative research approach.

The nature center preschool directors were purposefully selected from a group of nature preschools identified in a previous study on the state of nature preschools in the United States (Bailie et al., 2009). Multiple variation sampling was used to choose the

preschool directors from half of the identified nature preschools that responded. The multiple variation included three factors: educational background or experience of the director (early childhood vs. environmental education); size of the preschool; and longevity of the program. Justification for limiting the participants to directors of nature center based preschools is based on the field of inquiry that this study examined. This study was specifically designed to explore how nature center based preschool directors create and implement program curriculum and to find similarities and differences among the programs.

The within case analysis procedure included category construction and the constant comparative method to code themes (Merriam, 1998). The cross case analysis procedure included development of cross-case assertions using individual case findings and merged findings from several cases to answer the research questions (Stake, 2006). Participants were given the opportunity to review the transcripts of their interviews and asked to provide feedback.

Assumptions and Limitations of the Study

Based on my experience as a nature preschool director and teacher, five primary assumptions were made regarding this study. First, nature centers that operate or are connected with a nature preschool offer resources that most other preschools lack. These resources may include multiple acres of diverse habitats, access to wild animals, and experienced naturalists who help connect children to nature. Second, programs that start their day outside intentionally make spending time outside a priority of the program. Third, in order to teach at a nature preschool teachers need a background in early

childhood education and environmental education or educators of both disciplines need to be present in each class. Fourth, the background (e.g. early childhood education or environmental education) of the preschool director is critical for implementing a quality program. Fifth and finally, the space allocated to a nature preschool can affect the quality of the program.

There are two limitations to the study. First, only staff at nature center based preschools was interviewed. Therefore, the results can only be generalized to nature center based preschools. Second, I had limited time at each site (one half day to a full day) and the time I was able to observe classes at each site varied. Therefore, not all aspects of the programs may be represented.

Delimitations of the Study

Two delimitations of the study existed. First, in most cases only preschool directors were interviewed. However, some information was gleaned from the preschool teachers especially while I observed the classes. One nature center director was interviewed with the preschool director, and some of the preschool directors were also the preschool teachers. Therefore, the direct effectiveness of the nature preschool on the students was not included in the research. Second, the preschools were not chosen based on geography. Therefore, the effect of geographic areas of the country on the operation of the preschool was not evaluated.

The Researcher

At this time it is important to disclose my own background and expertise related to nature center based preschools. At the time of conducting this study, I had worked in the field of early childhood environmental education for 20 years at three different nature centers; as an early childhood environmental educator at the first nature center, a co-director of the Early Childhood Outdoors Institute at the second nature center, and as a nature preschool director at the third nature center, including starting the preschool in 2003. Thus, I bring to the inquiry process practical experience in early childhood environmental education in general and in the understanding of nature center based preschools in particular.

I acknowledge that the same experiences that are so valuable in providing insight could serve as a liability, biasing my judgment regarding research design and interpretations of findings. In addition to making my assumptions and theoretical orientation explicit at the outset of the study, I remained committed to engage in ongoing critical self-reflection by way of journaling and dialogue with professional colleagues. Moreover, to address my subjectivity and strengthen the credibility of the research, various procedural safeguards were taken, such as triangulation of data sources, triangulation of methods, and inter-rater reliability checks with professional colleagues.

Rationale and Significance

Nature center based preschools are starting to be popular among nature center directors and are therefore beginning to spring up in nature centers around the country. Their popularity arises because the program is in line with the nature center mission, and

as a tuition-based program it generally can pay for itself or even make a profit, which is uncommon in the non-profit world of nature centers. But as more and more nature preschools open, a greater need arises to have guidelines and high quality practices to follow. Without a set of professional standards, nature preschools will continue to vary from site to site in both quality and expectations. Interviewing several nature preschool directors and observing their classes helped to identify practices that may be common to all programs.

Information gathered is significant for nature center directors wishing to start nature preschools and to inform the professional standards of nature center based preschools. The potential practical application of this study is to begin the discussion of what these professional standards should be for nature center based preschools including for the curriculum, teacher requirements, director background, and the site's physical characteristics.

Definition of Terms Used in this Study

The following key terminology used in the study are defined as follows:

- For purposes of this study a nature center based preschool is defined as a government licensed preschool operated by or connected to a nature center or environmental education institution (Bailie et al., 2009). Throughout the text, these preschools may also be referred to as nature-based preschools, or nature preschools.
- At this stage of the research, high quality practices of early childhood environmental education at nature center based preschools will be generally

defined as excellent educational activities and experiences that integrate child development and environmental education goals in teaching young children and follow the quality standards set forth in early childhood education developmentally appropriate practices and environmental education principles of interpretation and guidelines for excellence (Beck & Cable, 2011; Copple & Bredekamp, 2009; North American Association for Environmental Education [NAAEE], 2010).

- Nature deficit disorder is defined as “the human costs of alienation from nature, among them: diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses” (Louv, 2005/2008, p. 36).
- Extinction of experience refers to the loss of connection to the natural world as when “citizens grow more removed from personal contact with nature, awareness and appreciation retreat. This breeds apathy for environmental concerns” (Pyle, 1993, p. 146).
- Biophilia is “the innate tendency to focus on life and lifelike processes” (Wilson, E.O., 1984, p. 1).

Organization of the Study

This dissertation is structured in five chapters. The first chapter introduces the study, explains the purpose and significance of the study, provides the research questions, and defines the terms used in the study. The second chapter provides a review of related literature including; historical underpinnings and high quality practices of environmental education and early childhood education, indicators of nature deficit and the benefits of

nature for young children, the intersection of early childhood education and environmental education, and nature center based preschool programs. This chapter also proposes a theoretical framework used to formulate the study. The third chapter outlines the qualitative methods used to collect and analyze the data in order to answer the research questions. The fourth chapter presents the findings of the study. The fifth chapter highlights implications, conclusions, and recommendations of the study.

CHAPTER 2 LITERATURE REVIEW

Introduction

The purpose of this multiple case study is to explore, with a sample of preschool directors, how nature center based preschools integrate child development and environmental goals in teaching young children.

Nature center based preschools are located at the intersection of early childhood education and environmental education. Therefore, in order to better understand the need for this study and where it fits within the fields of early childhood education and environmental education, the following review of the literature surrounding these two disciplines is discussed, in particular, the historical underpinnings and high quality practices associated with each. The connection between children and nature is explored, including contemporary studies of the indicators of nature deficit and the benefits of nature for children, with an eye towards understanding the place that early childhood environmental education fits. Early childhood environmental education literature is reviewed to see where the intersection of these two disciplines is headed in the future, especially involving nature preschools.

The following is a summary of the four areas of literature reviewed:

1. Environmental education: The historical underpinnings of environmental education are reviewed from the nature study period in the 1800s to the sustainability movement of the present day. Emphasis is placed on the role of the field of interpretation in the National Park Service in the 1950s, as well as the burgeoning of environmental education in formal and informal education in the

1960s and 1970s, primarily associated with the first Earth Day, and their specific role in teaching young children. Guidelines for excellence in environmental education, principles of interpretation, and the Earth Charter are reviewed as methods of communicating high quality practices in the field of environmental education.

2. Early childhood education: The historical underpinnings of the most important early childhood theoretical and philosophical foundations of contemporary early childhood education are reviewed with an emphasis on where nature education fit in these approaches. Developmentally appropriate practice is reviewed as the method of communicating high quality practices in the early childhood field.
3. Children's connection to nature: The Biophilia Hypothesis and other relevant studies that focus on children's connection to nature are included. Contemporary studies describing the consequences of nature deficit are reviewed. The benefits of nature for children are discussed, specifically focusing on health benefits, significant life experience, environment based education, and the implication of nature education on the developing brain.
4. Early childhood environmental education: The intersection of early childhood and environmental education is reviewed with a specific emphasis on nature preschools.

Multiple information sources were used to conduct this literature review including books, dissertations, Internet resources, professional journals, and periodicals. No specific delimiting time frame was used around which to conduct this search. Because of

the historical development of early childhood and environmental education, a time frame might preclude the inclusion of substantial relevant material.

Each topic reviewed ends with an interpretive summary of how the literature informs my understanding of the material and how the material contributes to the ongoing development of the study's conceptual framework.

In the last section of this literature review a conceptual framework is proposed to help guide this study. The framework is based on the research questions proposed in Chapter 1. Several theoretical frameworks of high quality practices in early childhood education and environmental education are used as lenses to weave an understanding of early childhood environmental education practices.

Environmental Education

Environmental education has its roots in the nature study movement of the late 19th and early 20th centuries. One hundred years later the debate about the benefits of immersing children in the natural world continues. In the following review, I take a look at the historical underpinnings of environmental education and related high quality practices.

Historical Underpinnings

Environmental education, or as it has been renamed, “education for sustainability” (Gough, 2006), has been an integral part of the human experience for a long time. “For many centuries, starting with cave dwellers, environmental education was associated with survival” (Hug, 1998, p. 1). Although, as Hug (1998) suggests there are writings that go back very far, the most pertinent influences come from diverse areas over the past 140

years when nature study, interpretation in the newly established national parks, conservation, and Earth Day all contributed to environmental education and eventually to the United Nations Decade of Education for Sustainable Development. Kevin Armitage (2009) suggests that nature study played a significant role in developing environmentalists:

Nature study is clearly the foundation of environmental education and was a forerunner of environmentalist ideologies such as deep ecology.

Moreover, many of the central figures in the environmental movement, such as Aldo Leopold and Rachel Carson, were grounded in nature study as children, and their mature thought clearly and explicitly embraced the nature study of their upbringing. (p. 13)

In 1873, on Penikese Island in Buzzards Bay off the coast of Massachusetts, Louis Agassiz, from Cornell University, started what is probably the beginning of scholastic nature study. There he welcomed public school teachers to the Anderson School of Natural History, the first biological field station in America. “By the study of nature, Agassiz meant the direct observation of natural phenomena rather than learning about the outdoors from textbooks” (Armitage, 2009, p. 15). This began a movement that lasted through the next four decades, morphing from the university “study of nature by the ‘natural method’... [to] a product of the elementary schools” (Bailey, 1903, p. 6-7) investigating natural science. Agassiz’s notion that students should study nature directly rather than from books and that public teachers should experience nature themselves so they could share this with their students produced the rallying cry for the nature study movement, “study nature, not books” (Armitage, 2009).

At the turn of the 20th century, with the advent of urbanization and the industrial revolution, children were being separated from nature. Child-centered progressive education, known as the “new education” focused on authentic experiences for children where they exercised problem-solving skills in real world applications. At the center of progressive education was nature study. “Indeed, one finds nature study at the core of the brilliant experimental curricula that led to many of the best innovations in what became known as progressive education” (Armitage, 2009, p. 52).

Some of the best-known educators in the nature study movement included Wilbur Jackman, Liberty Hyde Bailey, and Anna Botsford Comstock. Jackman was a science teacher recruited to direct the nature study program at Chicago’s Cook County Normal School in the late 1890s. As a laboratory school, the Normal School employed holistic and progressive theories of education. Nature study was a good fit for teaching science in this setting. A student of Nathaniel Shaler, who himself was a student of Agassiz, Jackman believed that children needed direct contact with nature in order to develop their observation and reasoning skills. He developed his ideas in the seminal book, *Nature Study for the Common Schools*, published in 1891 from bi-monthly “Outlines in Elementary Science” pamphlets he had designed for teachers the year before. In it Jackman (1891) describes, “The avenues through which the elements of the concept must be gained are the senses, and therefore the very essence of science work, upon whatever plan conducted, must be direct, individual observation...In these early interpretations, lie the beginning of the reasoning power, and with its development comes self-reliance, independence of thought, and a general strength of character which marks a man among men” (p. 2). He also recommended that the natural science subject matter be selected “in

its proper season” (p. v.), be correlated with other subjects, and afford the children the opportunity “to become life-long students” (p. 6). Not surprisingly, Jackman was a colleague of John Dewey who “concurred with nature study advocates that learning was inseparable from experience” (Armitage, 2009, p. 55). Jackman and Dewey clearly had an influence on each other’s thinking. The nature study method took on the Deweyan slogan “learning by doing” and Dewey developed a holistic view of nature that encouraged sympathy for nonhuman life (as cited in Armitage, 2009), which was one of the outstanding features of the nature study movement.

One of the challenges to nature study was the demanding role of the teacher and the difficulty finding qualified teachers. “Teachers needed to be expert enough to take the native interests of children and translate them into practical, hands-on activities” (Armitage, 2009, p. 56). Finding scientifically trained teachers was difficult; so much time in the nature study movement was spent on training teachers due to a lack of scientific knowledge. Jackman (1891) advocated for a child-centered approach to teaching nature study that emerges from studying the child, “It is obvious that the methods of instruction adopted by the teacher...must come...from a close study of the child” (p. 8). The curriculum also comes from the child at the center, “In the beginning of science instruction and to the end, the fact must be recognized that the child stands at the center of the universe, and from first to last is touched by everything in it. A complete and symmetrical course of instruction must proceed outward from this center” (p. 10).

Jackman suggested that science study be broad rather than focused on specific subjects in the elementary years and that there be no fixed order of topics. He suggested that, “the teacher must take his cue from nature and from his own immediate

surroundings...The work should therefore be planned to suit the changing and recurring seasons” (p. 12). To overcome the teacher’s lack of knowledge or understanding, Jackman suggested that, “He should without hesitation begin with the simple things around him, and grow with the pupils” (p. 12).

In 1889, simultaneously, in other areas of the country, nature study began to take hold and by 1903, when Liberty Hyde Bailey published his book, *The Nature Study Idea*, the movement was in full swing. Bailey’s book extolled the virtues of the nature study movement including the child-centered aspect, letting children choose the subject matter, and following the cycle of the year. In choosing teachers Bailey (1903) suggested that they be “the fearless teachers – the ones that are anxious to arouse the pupils even though they do not do it by the book... The ambition to teach and the love of doing for a child are the fundamental requisites” (p. 133 & 143). He also recommended that “experience should come before theory” (p. 142) and contact with living things before reading about them in a book, that nature study should not be confined to schools alone but should take place at home, and that nature study should be correlated with other subjects (Bailey, 1903).

Anna Botsford Comstock, a member of the faculty at Cornell University where Bailey resided, wrote the *Handbook of Nature Study* in 1911. This work boasts over 900 pages, reached 24 printings by 1939, and is still in print today. Anna Comstock was a biologist, writer, artist, and educator. She truly embodied the nature study principles. Her “artistic creativity and scientific achievement exemplified the nature study movement’s attempt to combine aesthetic and ethical appreciation for the natural world with the stringent and objective method of professional scientific inquiry” (Armitage, 2009, p. 67-

68). Echoing Bailey and other nature study advocates, Comstock believed that children needed to experience nature first before being given the facts. “The child should never be required to learn the name of anything in the nature-study work; but the name should be used so often and so naturally in his presence that he will learn it without being conscious of the process” (Comstock, 1911, p. 11). She wrote the handbook for teachers who she suggested need to have a love of nature in their heart so the children will love it also. She felt that teachers should admit when they do not know something:

Moreover, the teacher, in confessing her ignorance and at the same time her interest in a subject, establishes between herself and her pupils a sense of companionship which relieves the strain of discipline, and gives her a new and intimate relation with her pupils which will surely prove a potent element in her success. (Comstock, 1911, p. 4)

She also advocated for nature study to be correlated with other subjects, “Nature-study should be so much a part of the child’s thought and interest that it will naturally form a thought core for other subjects quite unconsciously on his part” (Comstock, 1911, p. 16).

As the nature study movement gained traction, the idea of conservation became a part of their principles. Nowhere was it more evident than in the school gardens, “Gardens were especially important to conservationists because they embodied the notion that people and nature need each other” (Armitage, 2009, p. 111). Audubon activist Mabel Osgood Wright and Booker T. Washington were two of the educator-activists who felt that gardening could instill a love of nature and promote conservation. “School gardens solved two problems for the nature study movement. They were accessible to all,

even to urban children, and they provided for a practical, results-oriented pedagogy that appealed to teachers and parents alike” (Armitage, 2009, p. 113).

Other activities that promoted conservation included Arbor Day and Bird Day. Arbor Day was supported by the American Forestry Association to combat wasteful forestry practices and to emphasize the aesthetic appreciation of trees. J. Sterling Morton, Secretary of Agriculture, introduced Arbor Day in Nebraska as a tree-planting movement. Other states soon followed beginning with New York. “Bird Day was the precursor to Earth Day and other contemporary celebrations intended to broaden environmental awareness, such as International Migratory Bird Day” (Armitage, 2009, p. 93). Millions of schoolchildren became involved in bird protection through the Junior Audubon Clubs that sprang up in response to Bird Day (formed to protect birds from being killed for their feathers).

Conservation of nature, a prime motivator of the nature study movement, began to take on a different public perception at the advent of World War I. Gardens were tied to wartime expediency and conservation became tied to effectiveness of resource exploitation with the greater demand for food and materials. “The First World War exacerbated these trends because of the vital need to emphasize the physical sciences to combat the enemy’s poison gas and submarines. The biological sciences...took a backseat to the pressing concerns of the physical sciences” (Armitage, 2009, p. 199). Other factors that contributed to the decline of nature study were the difficulties in establishing these programs in the schools, particularly recruitment and training of teachers. Finding qualified teachers who were pedagogically competent to focus on nature study from a child-centered viewpoint was difficult and taking children out of

urban areas to be immersed in nature became logistically impossible. The postwar years saw a new education that was teacher dominated with a subject-centered curriculum. Nature study had the effect of establishing science in the schools, but without the progressive methods (Armitage, 2009).

However, the nature study ideals continued through the wilderness movement. Concurrent with the beginning of the nature study movement in the late 19th century, explorers and seekers of wilderness such as John Muir and Enos Mills were working to protect the vast wilderness of America. Muir wrote about the beginning disappearance of natural areas (Muir, 1901) and was a friend of Theodore Roosevelt, who was a strong proponent of protecting these areas. As the progressive educators initiated the nature-study movement in schools and homes, it was the explorers and adventurers who gave birth to the field of interpretation in non-formal settings. Both Muir and Roosevelt were forerunners in the field of contemporary environmental education. Prior to the establishment of the National Park Service, John Muir, founder of the Sierra Club,

supplementing aesthetic appreciation with scientific curiosity, sought to understand and explain the remarkable natural phenomena [he] encountered...In 1871 while living and working near Yosemite Valley, Muir recorded in his notebook, "I'll interpret the rocks, learn the language of flood, storm and the avalanche. I'll acquaint myself with the glaciers and wild gardens, and get as near the heart of the world as I can." Muir's use here of "interpret" has been cited as the first precedent for its later adoption by the National Park Service. (Mackintosh, 1986, p. 1)

The tradition of interpretation has a strong link with conservation. “As keepers of the culture [heritage interpreters] protect the natural environment and social structure of their surroundings by encouraging ongoing stewardship of those resources. Protection of natural and cultural resources is everybody’s responsibility, but interpreters help people better understand their connections to the world around them” (Merriman & Brochu, 2006, p. 1).

The field of interpretation began to spring up at the turn of the century at what would become future National Park sites, and following the passage of the National Park Service bill in 1916, park rangers served these functions. Early interpreters were naturalists and nature guides. Enos Mills, often described as the “Father of Heritage Interpretation” was influenced by John Muir, who taught him to become an advocate for protecting wild places. He also taught him natural history skills such as reading the rings of trees, “The peculiar charm and fascination that trees exert over many people I had always felt from childhood, but it was that great nature lover, John Muir, who first showed me how and where to learn their language” (Mills, 1913, p. 1). Mills lived in Estes Park, Colorado, and was a nature guide and advocate for Rocky Mountain National Park. He founded a nature guiding school and wrote 20 books before he died in 1920. Among them, *The Story of a Thousand Year Pine and Other Tales of Wild Life* offered stories of the natural world from one who studied them in depth (similar to Anna Comstock and others in the nature study movement). These stories provided interpretation of the natural history of the area. Another book called *The Adventures of a Nature Guide* provided insights into Mills’ work as a nature guide. One specific chapter called “Children of my trail school” describes Mills’ work with children. In it he

describes the playful antics and explorations he made with a group of children. After the day was through, he summarized the day's adventures, as follows:

They had been explorers in a wilderness, had camped by mighty rivers, had seen wild animals and strange nations. Their imaginations were on fire. This world had become an inexhaustible wonderland. These children were dealing with real things through interest and their imaginations blazed with more keenness than it was possible for the powers of legends and fairy tales to incite. They had been to school, had studied, had worked, and learned without realizing it. Their reports amounted to enthusiastic recitations of new, big lessons well learned. Best of all, they were happy, and were eager to go on with this schooling – this developing. (Mills, 1920, p. 157-158)

Mills' (1920) school became known as the Trail School and became a forerunner to non-formal programs that are found at nature centers today. He describes his method, which is similar to the nature study approach, "We try to develop in the child mind the spirit of exploration, so he may enjoy the search for facts, both in books and in the outdoors" (p. 165). His program was both child-centered and flexible, led by the interests of the children:

Interest gives the ability and energy to see accurately and the incentive to watch for things that may happen around us; adds purpose to every outdoor day. Such happy experiences based on interest truly enrich life. Agassiz said that his chief claim to distinction was that he had taught men to observe. Interest is the master teacher. (p. 159)

Mills found it difficult to find others who could be the same type of nature guide for the children as he was, “But to find individuals who will do this without becoming teachy or preachy and deadly to the children is most difficult. Most teachers, some parents, and many others want us to ignore interest and desire and force the children to memorize something which they consider worthwhile” (p. 172). The inability to find qualified teachers that can lead children outdoors in a developmentally appropriate manner seemed to be a running theme in the nature study movement and the field of interpretation.

As interpretation of natural and cultural history continued in the National Parks, the first chief naturalist was appointed in 1923, and in 1925 the Education Division became an equal unit alongside Landscape Architecture and Engineering. The Yosemite School of Field Natural History was founded that year, as well. Although the term “education” was being used to describe the interpretation program, the National Park Service made sure to distinguish it from traditional academic instruction:

“Our function lies rather in the inspirational enthusiasm which we can develop among our visitors”...a guideline distributed by the Education division in 1929 declared. It urged simple presentations “that will make even the most complicated natural phenomena understandable to visitors from all walks of life” and communication of concepts rather than data.

(Macintosh, 1986, p. 83)

Ecology developed as a scientific field in the 1920s, but it was the dust bowl in the American heartland in the 1930s that gave rise to conservation education (McCrea, 2005). Conservation education continued to grow in the 1940s (Merriman & Brochu, 2006) coming out of the need for forest management and preservation of resources,

“Conservation education thus differed from nature-study [and interpretation] because the expedient development of resources rather than the sympathetic interconnection of people and nature characterized the new course of study” (Armitage, 2009, p. 204). However, Aldo Leopold (1949), the founder of the Wilderness Society and a product of the nature study movement himself, published *Sand County Almanac* in 1949, where he talks about the need of several components to develop a conservation ethic, one of which is perception, “The perception of the natural processes by which the land and the living things upon it have achieved their characteristic forms (evolution) and by which they maintain their existence (ecology). That thing called ‘nature study’...constitutes the first embryonic groping of the mass-mind toward perception” (p. 173). He goes on to suggest that cultural values that renew contacts with wild things are of utmost importance, such as “any experience that reminds us of our dependency on the soil-plant-animal-man food chain” (p. 178). The conservation movement, according to Leopold, to be successful had to develop a land ethic, an ecological conscience that “in turn reflects a conviction of individual responsibility for the health of the land...the capacity of the land for self-renewal... [He saw] conservation [as]... our effort to understand and preserve this capacity” (p. 221).

In 1954, Freeman Tilden, a writer and thinker on park topics, was asked to reappraise the basic principles underlying natural and historical interpretation in the National Park System. In his landmark book, *Interpreting Our Heritage*, published in 1957, he set out to define the field of interpretation and identified six principles that should govern the field. The definition of interpretation, as written by Tilden (1957/1967) is, “An educational activity which aims to reveal meanings and relationships through the

use of original subjects, by first hand experience, and by illustrative media, rather than simply to communicate factual information” (p. 8). In the book, Tilden described six principles of interpretation that, “reflect the field-tested revelations provided by Enos Mills in earlier writings that included *Adventures of a Nature Guide*” (Merriman & Brochu, 2006, p. 19). These principles included relating to the visitor, provocative programming aimed at the whole person, and providing different programs for children than those for adults.

Just as Aldo Leopold was raised in the nature study movement, so was Rachel Carson, one of the central figures in the history of modern environmentalism. Her mother used Comstock’s *Handbook of Nature Study* to explore the natural world with her children in the woodlands outside their Pennsylvania home. The influence of the nature study movement in Rachel Carson’s young life is reflected in her writings, especially *The Sense of Wonder*, which was published posthumously in 1965 from an article she wrote nine years earlier for Women’s Home Companion called “Help Your Child to Wonder”. In it she shares how to immerse children in the natural world, allowing their innate sense of wonder to be expressed (Carson, 1965). It was her book *Silent Spring* published in 1962 that brought attention of the dangers of chemical pesticides (specifically DDT) to the general public. In an introduction to a new printing of this classic book, her biographer, Linda Lear (2002), wrote:

Rachel Carson’s alarm touched off a national debate on the use of chemical pesticides, the responsibility of science, and the limits of technological progress. When Carson died barely eighteen months later in the spring of 1964, at the age of fifty-six, she had set in motion a course of

events that would result in a ban on the domestic production of DDT and the creation of a grass-roots movement demanding protection of the environment through state and federal regulation. Carson's writing initiated a transformation in the relationship between humans and the natural world and stirred an awakening of public environmental consciousness (p. x).

With the push for math and science instruction before and after World War II, nature study continued to fade in the shadow of Sputnik, and natural history as a curriculum unit was all but extinguished during the peak of the cold war. In the 1960's the nature study and conservation movement eventually evolved into environmental education, as public awareness increased after publication of *Silent Spring*. As the decade came to a close, the National Environmental Policy Act of 1969 and the National Environmental Education Act of 1970 were passed, the first Earth Day was celebrated, and the first definition of environmental education was printed, "Environmental education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution" (Stapp, et al., 1969, p. 34). The National Park System began to produce National Environmental Education Development (NEED) materials for schools that reflected environmental awareness and values including interrelation and interdependence, continuity and change, and adaptation and evolution. The concepts were intended to be woven into the school subjects and the, "parks were encouraged to establish Environmental Study Areas (ESAs), to be visited by school classes using the NEED materials" (Macintosh, 1986, p. 68).

During the decade to follow, several organizations were founded around environmental education including the North American Association for Environmental Education (NAAEE) and the Association of Interpretive Naturalists (now the National Association of Interpretation). Internationally, UNESCO supported the Belgrade Charter – A Global Framework for Environmental Education featuring a working definition of environmental education that included it as an integral part of education, was value based, and was a call to action. Two years later the Tbilisi declaration “recommended a series of 10 criteria to help guide the development of environmental education programs worldwide” (McComas, 2002, p. 667) including awareness, knowledge, attitudes, skills, and participation.

The 1960s and 70s were also a time when many nature centers were founded, often on behalf of preserving a natural area that was ready to be destroyed by a highway or housing construction project. Environmental educators such as Steve Van Matre and Joseph Cornell developed programs that were experiential in nature and did not focus on facts, but instead involved participation in games and activities in the natural world. Van Matre established the Institute for Earth Education:

Earth Education is the process for helping people live more harmoniously and joyously with the earth and its life. In earth education, we deal with basic ecological concepts, the big picture of life, rather than with the minutiae – names and labels and such. We also work on developing feelings, caring about the natural world of which we are all a part. And we focus on our personal impact on the systems of life, making changes in the way we use energy and materials. (Earth Education, n.d.)

Joseph Cornell wrote *Sharing Nature With Children* and several other books where he introduced the “Flow Learning” method of environmental education. This is “a powerful process that brings its participants naturally and deeply into inspiring experiences of nature” (Cornell, n.d.). His books included nature games and activities to help the participants develop a personal connection with the natural world. For some, this experiential approach worked well because it focused on the emotional connection to nature, but it left out the type of nature study that provided knowledge about the natural world.

Focusing on the emotional connection also works well with young children, but for some the pendulum had swung too far. Weilbacher (1993), a student of Anna Comstock, suggests that Van Matre went too far in his approach and suggests that nature study should be an integral part of environmental education:

He overreacts, throwing out the baby with the bathwater. That we taught the names of plants and animals was fine; *how* we taught was not.

Didactic, heavy-handed lecturing does not work for any subject matter, not just nature study... We view EE as a continuum that starts with awareness, moves through knowledge and skills, and ends with action... The road to environmental literacy begins with nature study. Once students know that names and habits of their natural neighbors, educators can overlay the big picture concepts of cycles and communities, diversity and change. The concepts will then make so much more sense. And after the big pictures are fully painted, we can add the third layer – environmental problems and their solutions. (Weilbacher, 1993, p. 6)

Nature awareness and sensory experiences make sense for young children, but those providing environmental education focused its efforts on elementary and secondary education and had little to offer preschool children. Changing behavior was the primary focus; accomplished by increasing knowledge, leading to positive attitudes, which in turn should lead to action. However after reviewing several studies, Hungerford and Volk (1990) found that environmental education wasn't achieving its goals:

If environmental issues are to become an integral part of instruction designed to change behavior, instruction must go beyond an “awareness” or “knowledge” of issues. Students must be given the opportunity to develop the sense of “ownership” and “empowerment” so that they are fully invested in an environmental sense and prompted to become responsible, active citizens. (p. 18)

Hungerford and Volk found environmental sensitivity an important part of the formula to spur action, but typically not found in formal education, “environmental sensitivity is a function of an individual's contact with the outdoors in relatively pristine environments...[and take place] over long periods of time” (p. 15).

In the 1990s environmental education began to distinguish between education *about*, *in* and *for* the environment, often not taught in a holistic manner. Education about the environment deals with concepts and knowledge about environmental issues and is predominately cognitively based. “This approach which is also commonly referred to as environmental science or studies, is the prevalent form of environmental education in schools” (Tilbury, 1997, p. 2). Education *in*, (through or from) the environment is the direct environmental experience and is “pupil-centered and inquiry-based learning

facilitated by more open-ended and flexible teaching styles” (Tilbury, 1997, p. 2), often found in non-formal education programs such as nature centers. It is this approach that resonates most with early childhood education. Educating *for* the environment focuses more on developing values and action skills and “regards environmental improvement as an actual goal of education...Through engaging students in social and political education, education *FOR* the environment not only empowers them to take responsibility for their own actions but also enables them to reflect upon how these actions influence the environment” (Tilbury, 1997, p. 3). Tilbury (1997) described these three approaches as the “*head, heart and hand* approach to environmental education” (p. 5) and worked to promote it as a more holistic model in schools.

It is “education *FOR* the environment” that resonates with the next step in the evolution of environmental education that is now called “education for sustainability.” Several international conferences began to address the issues of sustainability including the Brundtland Report (*Our Common Future*) and the Agenda 21 report of the Rio Earth Summit. Credence was given to the crucial role that teacher’s have in helping to bring about changes needed for sustainable development and the “concept of sustainable development was introduced... and defined as ‘a development that meets the needs of the present without compromising the ability of future generations to meet their own needs’”(Postma, 2006, p. 6). Sustainability conferences continued, such as, the 2002 World Summit on Sustainable Development, held in Johannesburg, South Africa, and the United Nations Decade of Education for Sustainable Development (UNDESD) (2005-2014) that calls for “debates, discussions, agenda setting, and concrete actions around sustainability” (Davis, 2010, p. 11). Sustainability “is founded on principles of critical

inquiry, empowerment, participation, democratic decision making and the taking of action that supports sustainable living and aims for social change – it is transformative education” (Davis, 2010, p. 9).

In summarizing the roots of environmental education, NAAEE (2009), discusses nonformal environmental education programs, “By highlighting the importance of viewing the environment within the context of human influences, these perspectives have expanded the emphasis of environmental education to focus more attention on social equity, economics, culture, and political structure” (p. 5). The concept of sustainability has expanded environmental education to include a more holistic approach, but the roots of environmental education (nature study and interpretation) need to be better integrated into this new approach, especially for young children.

High Quality Practices

The most comprehensive approach for establishing high quality practices in the field of environmental education was taken by the NAAEE in 1993, called the National Project for Excellence in Environmental Education. “The National Project was designed to establish guidelines for the development of balanced, accurate, and comprehensive environmental education programs and to identify and provide examples of high quality environmental education practice” (Simmons, 2005, p. 163). The Project initiated several different, but interrelated efforts. These included *Environmental Education Materials: Guidelines for Excellence* in 1996, *The Environmental Education Collection – A Review of Resources for Educators* in 1997, *Excellence in Environmental Education: Guidelines for Learning (K-12)* in 1999, *Guidelines for the Initial Preparation of Environmental Educators* in 2000, *Non-formal Environmental Education Programs: Guidelines for*

Excellence in 2004, and *Early Childhood Environmental Education Programs:*

Guidelines for Excellence in 2010. “The guidelines documents were developed using a review and comment process...[and it] was well publicized in order to make participation by a wide variety of stakeholders possible” (Simmons, 2005, p. 181). These guidelines were developed to provide standards for the profession, but were criticized by some in the field as being too content oriented, “The world of environmental education focuses too much on formulating the content and outcome of environmental education, and too little on the quality of the learning process” (Wals & van der Leij, 1997, p. 18). The last guideline developed focused on early childhood environmental education. Professionals from early childhood education and environmental education were involved in drafting the guidelines. This is the first time that both professions were consulted together to develop a set of high quality practices for early childhood environmental education. Several key characteristics were identified including: the program philosophy, purpose, and development focusing on nature and the environment and the education of young children; developmentally appropriate practices; curriculum framework for environmental learning; play and exploration; places and spaces; and educator preparation (North American Association of Environmental Education [NAAEE], 2010). More detailed information about these guidelines is included later in this chapter with the conceptual framework.

The field of interpretation developed its own set of guidelines in the mid-1950s. Freeman Tilden’s six principles incorporated Enos Mills’ philosophy of nature guiding. Tilden’s principles have been used for the past 50 years. In 2011, Larry Beck and Ted Cable expanded the principles to 15 in *Gifts of Interpretation: Fifteen guiding principles*

for interpreting nature and culture. In this book they tracked the evolution of the philosophy of interpretation and presented Tilden's six principles with consistent observations from Mills (Beck & Cable, 2011). The new framework that they created starts with a restatement and rewording of Tilden's principles and they offered, "nine new principles that provide a more elaborate interpretive philosophy" (p. xxiv). Out of the 15 total principles, several, but not all, relate to early childhood environmental education. These include: sparking an interest by relating the topic to the experience of the audience; understanding that children's programs require a fundamentally different approach than adult programs; honing one's skills, thus supporting a commitment to professional development; providing inspirational programs, rather than only informational; addressing the whole person; including provocation in the programs rather than just instruction; having a passion for the work; inspiring conservation; and being intentional and thoughtful in developing programs (Beck & Cable, 2011). A comparison to the early childhood developmentally appropriate practices is provided later in this chapter with the conceptual framework.

Another set of guidelines that is beginning to be used, especially in connection with sustainability, is the Earth Charter:

The Earth Charter is a declaration of fundamental ethical principles for building a just, sustainable and peaceful global society in the 21st century. It seeks to inspire in all people a new sense of global interdependence and shared responsibility for the well-being of the whole human family, the greater community of life, and future generations. It is a product of a

decade-long, worldwide, cross cultural dialogue on common goals and shared values. (Earth Charter, n.d.)

The principles of the Earth Charter fall under four topics that relate well with the holistic nature of sustainability. They include: 1) respect and care for the community of life; 2) ecological integrity; 3) social and economic justice; and 4) democracy, nonviolence, and peace.

All of the guidelines listed above fall into the category of high quality practices in environmental education.

Summary

From the nature study movement and the wilderness guides through the era of conservation, to full blown environmental education and sustainability, there have always been those who advocated for children to experience the natural world with a sense of wonder. Enos Mills, Anna Comstock, Rachel Carson, and Joseph Cornell each in his or her own way advocated for opportunities where children could connect with nature through direct experiences that involved their senses and emotions. Mills (1920) reflected on his work with children, “Nature’s storybook is everywhere and always open... The chief means of interesting children in nature is to expose them – to bring them into contact with outdoor things” (p. 158 & 181). Rachel Carson (1965) shared her insights:

I sincerely believe that for the child, and for the parent seeking to guide him, it is not half so important to *know* as to *feel*. If facts are the seeds that later produce knowledge and wisdom, then the emotions and the impressions of the senses are the fertile soil in which the seeds must grow.

The years of early childhood are the time to prepare the soil. (p. 45)

Out of this exposure and early positive connection to the natural world, from an environmental education standpoint, the goal has always been that children will grow up to take care of what they love and become stewards of the environment.

Environmental education, when offered at all, has focused on K-12 ages at formal schools and non-formal education centers (such as museums and nature centers).

Although preschool aged children often take field trips to nature centers, the environmental educators are not trained to provide age appropriate programs. Often the programs are cognitively based or rely too much on games and activities that are for older children. Nature study and nature guides of the past offer a promising approach that fits well with young children; learning through the senses, child-centered, experience based programs that are integrated throughout the curriculum. The difficulty, as it was in the past, is finding qualified teachers with the natural history knowledge and age appropriate practices to provide environmental education programs for young children.

Early Childhood Education

The National Association for the Education of Young Children (NAEYC) defines early childhood as the time between birth and 8 years of age (Copple & Bredekamp, 2009). The focus of this review is primarily on the preschool and kindergarten ages (3 to 6 years old) and the role that nature has played in the development of early childhood education. The following review focuses on the influence of several early theorists and educators including Johann Amos Comenius, Jean Jacques Rousseau, and Johann Heinrich Pestalozzi, and several philosophies of education including Friedrich Froebel's

kindergarten, Rudolf Steiner's Waldorf education, Maria Montessori's method, John Dewey's progressive education, and Loris Malaguzzi's schools of Reggio Emilia.

Historical Underpinnings of Nature in Early Childhood Education

Early roots of early childhood nature education began in the 1600s with Johann Amos Comenius, who was a Moravian bishop. "Comenius...thought that learning is best achieved when the senses are involved and that sensory education forms the basis of all learning" (Morrison, 2001, p.70). Nature education is the primary source of sensory learning. He believed that "all education should follow the natural order of the child's development" (Weber, 1984, p. 22) and that the child's innate abilities should be allowed to unfold naturally. His theories stemmed from the belief that the education of young children could affect social reform. Realizing that they need concrete materials to learn, he created the first picture book for young children. In addition to his emphasis on concrete and sensory learning, he also promoted the need for providing enough time for learning to take place. Other early advocates of sensory learning and nature education include Rousseau and Pestalozzi.

Jean Jacques Rousseau published *Emile* in 1752, in which he described what he envisioned as the ideal educational program by writing about raising a hypothetical child from birth to adolescence. He conceived of education as character building and the early years of education as tending to building of the body and acquisition of knowledge through the senses. "The period of childhood should be devoted to physical development and the training of the senses" (Painter, 1903, p. 253). Rousseau believed that education occurred through nature, people, and things. The nature of children "unfolds as a result of maturation according to their innate timetables" (Morrison, 2001, p. 72). He

recommended the observation of children's growth in order to be able to provide experiences at appropriate times. This reflects a child-centered approach. Rousseau's "two fundamental truths which have perhaps exerted the widest influence are these: 1. Nature is to be studied and followed. 2. Education is an unbroken unity, extending from early childhood to maturity" (Painter, 1903, p. 251).

Whereas Rousseau only wrote about education, Johann Heinrich Pestalozzi wrote and then put in practice his beliefs about education, which built on the belief that education should follow the child's nature. He believed that sensory experiences could enable a child to achieve their natural potential. Through "object lessons", Pestalozzi utilized manipulatives that were used for counting and measuring. Pestalozzi's generous nature and work with poor children at a school he started in Yverdon, Switzerland, had an influence on future educators who visited the school.

Of those who visited and worked in Pestalozzi's school in Yverdon, Friedrich Froebel observed and assessed the school in action. He spent two years there beginning in 1808. He took Pestalozzi's ideas of the child unfolding and developed a curriculum and educational methodology for 3 to 6 year olds (since typically children under seven did not attend school) that included the role of the teacher as observer of children and designer of activities and experiences based on these observations. "Froebel accepted the great body of Pestalozzi's educational principles. He held that education is a harmonious development of the human faculties; that its principles are to be found in a study of Nature; that development depends upon the self-activity of the learner; and that observation is the basis of knowledge" (Painter, 1903, p. 285). As a child Froebel spent time in the natural world preferring this to formal studies. At fifteen he became a

forester's apprentice and in college studied biology. These early influences in the natural world may have had an impact on his ideas to incorporate the study of nature in his kindergarten. He compared a child to a seed that is planted and as it grows, the teacher (or gardener) nourishes and protects it as it unfolds according to its own nature. In his curriculum he assigned a small garden plot to each child to cultivate and a larger one for several children to work on together. He would later become known as the "father of the kindergarten because he devoted his life to developing both a program for young children and a system of training for kindergarten teachers" (Morrison, 2001, p. 77). As a teacher, Froebel "perceived that the method of instruction must be directed by the laws of development as well as by those of the subjects to be taught" (Weber, 1984, p. 35). One of his greatest contributions to early childhood education is the importance of play in the education of young children. He developed "gifts" (concrete objects for examination and manipulation by young children in an unstructured way) and "occupations" (materials for developing psychomotor skills) for students to use in order to connect with their inner beings as they naturally developed. He introduced the "play circle", song, poetry, gardening, and play into the daily activities of the class. Some of his ideas included the connection between spiritual and physical development in childhood, in that physical development is directly developed in early childhood and spiritual development takes place through the exercise of the senses (as cited in Painter, 1903).

Froebelian ideas reached the United States through teachers who had been trained in his method. The first kindergarten in the United States was established in Watertown, Wisconsin, in 1856 by Margarethe Schurz and was based on Froebel's ideas. The first public school kindergarten was taught by Susan Blow, an ardent follower of Froebel. She

collaborated with William Harris, superintendent of schools, to open the kindergarten in St. Louis in 1873. However, it took a long time for kindergartens to receive widespread acceptance in the public schools. The influence of kindergarten introduced art, music, nature study, and games into the elementary grades (Spodek, 1982). Kindergartens were part of private and public schools, as well as church run and settlement houses in slum areas. Each took on aspects of their supporters, thus creating an inconsistent approach to early childhood education (similar to nature preschools now).

Although nature education seemed to be a fundamental part of early childhood education, the influences of the primary schools began to seep in as kindergartens became more affiliated with public schools. The influences of early childhood education and the roots of primary education differ. “In one conception the child plays an active role in his own learning both physically and intellectually; in the other the learner is subservient to reinforcements that lead him in designated directions. Contrasting philosophical and psychological beliefs undergird the two conceptions” (Weber, 1984, p. 6). Early childhood education and developmentally appropriate practice are based on theories of child development, whereas, primary “educational practice is dictated more by social, political, and economic considerations” (Elkind, 1986, p. 117). Because of the differences in philosophy between early childhood education and primary schooling, there were often difficulties in transitions from one to the other. This reflects the struggle between developmentally appropriate practice and academic instruction. Unfortunately nature education was often sacrificed when academic instruction took on more importance.

Early childhood education was influenced more by the “developmentalists”, than the other philosophies of education, particularly curriculum ideas of John Dewey.

Because early childhood education has its roots in child development, the needs of the child took on a more important role than the subject matter to be taught. Dewey believed that there needed to be a connection between the child's classroom activities and his life outside the school. He believed that education should be a continuous and deliberate reconstruction of experience. The actively learning child was at the core of Dewey's philosophy. Learning by doing, meaning concrete engagement with materials and the environment, relating to personal needs and desires. Dewey's influence on early childhood education can be seen in the items found in an early childhood classroom today. The housekeeping corner is one that emulates real experiences at home as does the woodworking area (Dewey, 1929/1997). The insistence on real and authentic experiences and materials has their basis in Deweyan theory and by necessity must include the natural world:

For no other thinker of the period can we trace the changing thought of leaders in the field of early childhood education as closely as to Dewey and the principles he set forth. The evidence for this comes...in the transformation of the curriculum. In the organization of the classroom, the selection of experiences to be undertaken, the new kinds of materials to be provided, the freedom for the child to pursue his interests, and the new conception of the teacher's role, we find reflections of Dewey's recommendations (Weber, 1984, p.101).

The role of nature education in the Montessori method reflects the child's natural state. Maria Montessori, the first woman in Italy to receive a medical degree, worked with mentally retarded children. "She became interested in educational solutions for

problems such as deafness, paralysis and ‘idiocy’” (Morrison, 2001, p. 78) realizing that the mental deficiencies she was seeing were more of an educational issue rather than a medical problem. Montessori became interested in why “normal” children of the poor ended up with lower results on reading and writing than the mentally retarded children she had worked with. This led her to open the Casa dei Bambini or Children’s House for young children who lived in the tenement houses in Rome. Montessori believed that children could be independent in a prepared environment that included child sized furniture, well organized learning materials, and access to outdoor areas where children could take part in gardening. Jean Itard, a physician who developed educational systems for deaf-mutes and educated the “savage of Aveyron”, influenced Montessori. “The savage of the Aveyron was a child who had grown up in the natural state: criminally abandoned in a forest...had survived for many years free and naked in the wilderness” (Montessori, 1964, p. 149). The account of this boy’s education by Itard was a remarkable story that became the basis for Montessori’s comments on nature in education. “Scientific observation then has established that education is not what the teacher gives; education is a natural process spontaneously carried out by the human individual, and is acquired not by listening to words but by experiences upon the environment” (Montessori, 1946, p. 3). Montessori relied on agricultural labor or the culture of plants and animals as the means for children to work in nature. “He still belongs to nature, and, especially when he is a child, he must needs draw from it the forces necessary for the development of the body and the spirit. We have intimate communications with nature which have an influence, even a material influence, on the growth of the body” (Montessori, 1964, p.153). Montessori listed the benefits of

agriculture and animal culture for children (gardening and taking care of animals) in the following:

First. The child is initiated into observation of the phenomena of life...Second. The child is initiated into foresight by way of auto-education; when he knows that the life of the plants that have been sown depends upon his care in watering them, and that of the animals, upon his diligence in feeding them...Third. The children are initiated into the virtue of patience and into confident expectation...Fourth. The children are inspired with a feeling for nature...Fifth. The child follows the natural way of development of the human race. (Montessori, 1964, p.156-160)

In these remarks, Montessori connected nature education with the natural development of the child, as these cannot be separated in a child-centered classroom.

Rudolf Steiner influenced early childhood nature education through his educational method called Waldorf education. Steiner founded a school in 1919 just after World War I in Stuttgart, Germany. It was started in response to a request from workers at the Waldorf-Astoria Cigarette Factory (which is where it got its name) with the hope that schooling could be changed to meet the needs of the children in a loving way. “The curriculum and methodology that Steiner laid down at the time were based on a developmental approach to the child...that was meant to be a melding of art and science, out of which the child’s natural sense of reverence would arise” (Schwartz, n.d.a, p. 1). In order to allow the child’s natural development, the Waldorf classroom was designed to be warm and beautiful with a home-like atmosphere providing safety through predictable routines. The teacher engages in domestic activities that children observe and can imitate

and eventually join in. This includes baking, cooking, handicrafts, and adapting work to the changing seasons. The classroom contains natural materials from nature, such as pinecones, shells, rocks, and wood to be used as both decoration and in creative play. The years spent playing with natural materials build a foundation for scientific understanding in later years:

Waldorf kindergarteners are exposed to a great deal as well: the realities of food preparation, the wind, the rain, warmth and cold, brambles and briars (on their daily walks); in some settings, they encounter sheep and goats, chickens and ponies, birds and fish, in all their raw reality, uncaged and unlabelled. (Schwartz, n.d.b, p. 6)

Reverence for the earth and an emphasis on all natural materials engenders a sense of appreciation and responsibility of the natural world.

The Reggio Emilia approach to early childhood education provides additional inspiration for nature education. Transported from Italy, this child-centered approach is refreshing in its ability to transform a classroom and engage children according to their interests. Started in the 1960's by Loris Malaguzzi, "this approach fosters children's intellectual development through a systematic focus on symbolic representation" (Edwards, Gandini, & Forman, 1998, p. 7). The fundamental principles of the Reggio approach include the teachers viewing the child as capable, strong, and curious about their environment. Nature provides a basis for inquiry and development of theories that the children can test. Children are able to choose from many different materials and methods to communicate their discoveries and to make their thinking visible. "Young children are encouraged to explore their environment and express themselves through all

of their available ‘expressive, communicative, and cognitive languages,’ whether they be words, movement, drawing, painting, building, sculpture, shadow play, collage, dramatic play, or music” (Edwards et al., 1998, p. 7). The space has an underlying order and beauty to it. “Every corner of every space has an identity and a purpose, is rich in potential to engage and to communicate, and is valued and cared for by children and adults” (Caldwell, 1997, p. 5). Teachers facilitate children’s exploration and guide experiences and problem-solving. Teachers also see themselves as researchers alongside the children. Documentation that includes photos, children’s work and language are used to communicate children’s thinking and work to parents, other teachers, and the children themselves for reflection and study. The emphasis on a beautiful environment that includes natural colors and materials incorporates nature and the outdoors as a part of the natural development of the child.

Nature education, from an historical perspective, has been an outgrowth of child development providing opportunities for authentic experiences for children’s growth, especially for learning through the senses.

High Quality Practices

High quality practices in early childhood education are clearly articulated by the National Association for the Education of Young Children (NAEYC) in the form of developmentally appropriate practices. Developmentally appropriate practice (DAP), in early childhood education, is about meeting children where they are according to what is known about child development, the individual child, and the social and cultural contexts in which the child lives (Copple & Bredekamp, 2009). These practices are based on research in child development. In the book, *Developmentally Appropriate Practice in*

Early Childhood Programs, 12 major principles in human development and learning are articulated that are based on that research and “along with evidence about curriculum and teaching effectiveness, form a solid basis for decision making in early care and education” (Copple & Bredekamp, 2009, p. xii). These major principles provide a foundation for high quality practices, with the understanding that all domains of child development are interrelated. The principles continue by describing children’s learning and development as: following sequences; proceeding at varying rates from child to child; resulting from dynamic interaction of biological maturation and experience; being influenced by early experiences and social and cultural contexts; requiring secure, consistent relationships; and advancing when children are challenged and have opportunities to practice new skills. And finally, the principles also put forward that: optimal periods exist for certain types of development; development proceeds towards greater complexity; children learn in a variety of ways; play is important; and children’s experiences shape their motivation and approaches to learning (Copple & Bredekamp, 2009). Providing a child centered, play based, and integrated curriculum; addressing the whole child, and using intentional teaching practices are important elements that come out of these principles and also work well for connecting young children to the natural world.

The guidelines for teachers to be developmentally appropriate include: creating a caring community of learners; teaching to enhance development and learning; planning curriculum to achieve important goals; assessing children’s development and learning; and establishing reciprocal relationships with families. The need for outdoor education is mentioned under “Creating a caring community of learners”, part D. “Outdoor

experiences, including opportunities to interact with the natural world, are provided for children of all ages” (Copple & Bredekamp, 2009, p. 17). Other than this statement, nature education, as a focus, is not mentioned. This is perhaps an oversight, but one that needs to be remedied, as the principles outlined above are achieved more authentically through nature education.

Summary

The same educators (e.g., Pestalozzi and Dewey) who were influential in incorporating nature in early childhood education also influenced the roots of environmental education. There are references made by Armitage (2009) that these early childhood educators had an influence on the nature study movement, and by Merriman & Brochu (2006) that they had an influence on the field of interpretation. It is not surprising then that common threads weave through the histories of both disciplines. They each have an approach to education that addresses the whole child, provides opportunities for sensory based learning, includes authentic experiences, and integrates subjects in the curriculum. However, the role of nature in early childhood education is primarily focused on child development, not environmental stewardship.

Since no quality standards currently exist for nature preschools, they are much like the early kindergartens in the mid to late 1800s that sprang up independently without a common set of guidelines. Nature preschools often follow the values of the nature center leadership or those of the preschool director and teachers, thus potentially producing an inconsistent approach across programs.

Connection Between Children and Nature

Unfortunately the world is losing natural areas and species in cataclysmic proportions. Global warming is having a devastating effect on the natural world, with an estimate of 25% of species predicted to go extinct by the year 2050 (Seidl, 2009).

Although the science that supports the concept of global warming is more certain than ever, many people are not concerned enough to make the changes necessary to try and alter the inevitable demise of the planet; possibly because, as Al Gore (1992) explains, “at some point during this journey we lost our feeling of connectedness to the rest of nature” (p. 1).

What is our connection to nature? Is it innate or learned? And why is it important that children have experiences in the natural world? E.O. Wilson (1984) introduced the term “biophilia” as, “the innate tendency to focus on life and lifelike processes” (p. 1). Biophilia contains a set of learning rules that “fall along several emotional spectra: from attraction to aversion, from awe to indifference, from peacefulness to fear-driven anxiety” (Wilson, E.O., 1993, p. 31). Stephen Kellert (1993) provides additional clarification about the concept:

The Biophilia Hypothesis boldly asserts the existence of a biologically based, inherent human need to affiliate with life and lifelike processes...The human need for nature is linked...to the influence of the natural world on our emotional, cognitive, aesthetic, and even spiritual development...The biophilia notion, therefore, powerfully asserts that much of the human search for a coherent and fulfilling existence is intimately dependent upon our relationship to nature. (p. 42-43)

David Orr (1994) suggests that, even though biophilia is innate, it is important that it take hold early in a person's life, "If by some fairly young age, however, nature has not been experienced as a friendly place of adventure and excitement, biophilia will not take hold as it might have" (p. 143). And for biophilia to take root and grow in a young person's life, natural places that are accessible and safe are required, along with the help of caring adults to guide and model behavior in a community based on intense love of the natural world (Orr, 1994). Orr (1994) suggests a "Biophilia Revolution" in which education is reshaped to foster innate biophilia and in a Deweyan progressive educational mode foster, "the analytical abilities and practical skills necessary for a world that takes life seriously...[providing] places of mystery and adventure where children can roam, explore, and imagine...Education that supports and nourishes a reverence for life would occur more often out-of-doors and in relation to the local community" (p. 147 & 148).

Maybe the reason for our ecological crisis is that we have not made nature a central part of our learning. "The biophilia hypothesis may gain its strongest support from scientific research that attempts to understand the relationship between childhood development and immersion in the green world" (Armitage, 2009, p. 212). And Kellert (2005) asserts that, "The importance of childhood must be recognized as the period when this contact with nature first occurs. Even for the human animal, which appears uniquely capable of constructing its world and learning throughout its lifetime, the fundamental development of any biologically rooted tendency is likely to occur during childhood" (p. 64).

Another contribution to the problem is an effect that Peter Kahn (2007) talks about called "environmental generational amnesia." It is a psychological phenomenon

that affects people from generation to generation. Each new generation constructs a baseline of what the normal environment is, based on their experience in childhood. However, “with each ensuing generation, the amount of environmental degradation can and usually does increase, but each generation sees its environment as the norm, as the non-degraded condition...Thus we’re constructing our environmental ethic, and structuring our relationship with nature, based on incomplete and partly inaccurate perceptions and understandings” (Kahn, 2007, p. 204). And the opportunities to have experiences in nature are declining. As Robert Michael Pyle (2002) explains, the concept of “extinction of experience” suggests that children do not have the same opportunities to experience the natural world in a wild and spontaneous way as generations before because of the “absence of formal nature study, the retreat of diverse habitats from the home ranges of the young...the shrinkage of those ranges due to security concerns...[and] the rise of the virtual in place of the real” (p. 317). All these concepts add up to the fact that children are becoming more disconnected from nature than ever before and this threatens our very existence on this planet.

Indicators of Nature Deficit in Children’s Lives

In *Last Child in the Woods*, Richard Louv (2005/2008) coined the term “nature deficit disorder” to reflect the change and quality of time children spend in the natural world. Especially the effect that lack of nature plays on a child’s developing senses and on their health. In a report from the Children and Nature Network in 2009, in summing up what we know to date about children’s nature deficit, Cheryl Charles and Richard Louv state that:

Numerous studies offer both quantitative and qualitative indicators of

changes in childhood, among them: perception of growing demands on children's time, resulting in less free and unstructured outdoor playtime in nature than experienced by previous generations; reduced mobility and less range for exploration, including reduction in walking or riding a bike to school; growing fear of strangers, traffic and nature itself; and a dramatic rise in obesity and severe overweight, as well as vitamin D deficiency and other health issues that may in part be related to low levels of outdoor activity and a sedentary lifestyle. (p. 1)

Lack of outdoor experiences also limits the type of experiential activities that impact children's brain development (Damasio, 2003, Ginsburg, 2006). Antonio Damasio (2003) suggests that lack of experiential activities and a faster lifestyle do not allow children to create somatic markers that provide the development of ethical decision making, leaving an individual with an unclear ability to act according to what is right and wrong. Yet children today spend less hours outdoors playing than did their parents (Clements, 2004; Natural England, 2009).

Change in children's playtime outdoors. In a study of 830 mothers of children aged 3 to 12 years old, 70% reported playing outdoors every day when they were young, compared with only 31% of their children. Fifty-six percent of the mothers that played outdoors remained outdoors for three hours at a time or longer compared with only 22% of their children. Eighty-five percent of these mothers identified their child's television viewing and computer game playing as the number one reason for the lack of outdoor play. Eighty-two percent of them identified crime and safety concerns as factors that prevent their children from playing outdoors (Clements, 2004). A 2009 report on the

generational differences in freedom and contact with nature for children in England, surveyed 1150 adults and 502 children. Of the 1150 adults, 502 were parents of the children surveyed. The adults were divided by age (under 50 and over 50) and the children were age 7-11, thus representing three generations (children, parents and grandparents). The results indicated that contemporary children spend less time playing in natural areas than did children of previous generations; less than 10% of children compared to 40% of adults when they were young. Interestingly, the over 50 group spent the most time playing in natural areas, suggesting that this downward trend has been occurring for several generations. Although many children do not play in natural areas, the most popular activities of both children and adults were building a camp or den and exploring rock pools on the beach. Seventy-three percent of adults had a patch of nature near their homes when they were children and over half went there at least once or twice a week (usually walking), whereas 64% of the children have a patch of green near their homes, but less than a quarter of them go there once or twice a week (and often by car). Eighty-five percent of parents reported that they would like their children to be able to play in natural spaces unsupervised, but road safety and fear of strangers prevent them from giving their children that sort of freedom. In fact, children report that they are supervised 80% of the time in natural areas. Eighty-one percent of children report that they would like more freedom to play outside (Natural England, 2009).

Additional research on how children spend their time confirms that unstructured play has declined over a 20-year period from 1981 to 2002. From 1981 to 1997 there was a 25% decrease in play and a 50% decrease in outdoor activities such as walking, hiking and camping among children (Hofferth & Sandberg, 2001). For the five years from 1997

to 2002, unstructured play stayed the same for younger children, but there was a 37% decline in participation in outdoor activities (Hofferth & Curtin, 2006). Part of the reason for the decline in play and participation in outdoor activities is due to more time spent in childcare and less discretionary time because of working mothers. It was also due to an increase in organized activities and sports. This suggests a need for childcare centers and schools to provide unstructured time to play and opportunities for outdoor activities. However, in many public schools recess has been either eliminated or reduced often due to the pressure of raising test scores to meet no child left behind legislation. Government figures show that the proportion of schools that do not have recess ranges from 7% for the first and second grades to 13% by the sixth grade (“Rescuing Recess,” 2006) and others plan to reduce or eliminate recess in the future. A survey taken by the National Association of Elementary School Principals found 96% of the surveyed schools had at least one recess period in 1989, while a decade later only 70% had a recess period (Ginsburg, 2006). Lack of opportunity for outdoor play may also be resulting in an increase of obesity among children.

Increase in obesity in children. Childhood obesity has increased over the past 30 years according to data from the National Health and Nutrition Examination Survey (NHANES). Results from the 2007-2008 NHANES indicate 16.9% of children and adolescents aged 2-19 years are obese. Obesity is based on BMI values at or above 95th percentile. Among preschool children aged 2-5, obesity increased from 5% to 10.4 % between 1976-1980 and 2007-2008 and from 6.5% to 19.6% for 6-11 years olds. For adolescents aged 12-19, obesity increased from 5% to 18.1% during the same period (Ogden & Carroll, 2010). Studies show that obesity in childhood has a high probable

influence on being overweight as an adult (Center for Disease Control [CDC], 2007).

The alarming trends of an increase of obesity in young children have prompted several studies to determine the physical activity levels of preschool children. Although preschool children are often equated with being active, studies show that 89% of preschoolers are characterized as sedentary during the preschool day. As would be expected, preschoolers are more active during outdoor play, but even here it depends on various circumstances such as objects for play, open space available, social constraints, as well as teacher intervention (Brown, McIver, Pfeiffer, Dowda, Addy, & Pate, 2009). In addition, physical activity varies greatly, in one study, ranging from 4.4 to 10.2 minutes of moderate to vigorous physical activity (MVPA) per hour depending on the characteristics of the preschool the child attends (Pate, Pfeifer, Trost, Ziegler, & Dowda, 2004). Barriers to physical activity, often associated with lack of time spent outdoors, include inadequate facilities, weather-related policies, teacher attitudes and behavior, a focus on academics, economic and budgetary issues, and safety and injury concerns (Copeland, Sherman, Kendeigh, Kalkwarf, & Saelens, 2012).

If children are not active at preschool, then what happens when they get home? Another factor that contributes to obesity in young children is use of technology. One study connected watching more than two hours per day of TV and videos by preschool children with a higher risk of being overweight. They also found that 36% of preschool children exceed the two hours per day norm (Mendoza, Zimmerman, & Christakis, 2007). Technology or screen time (watching TV, DVDs, using computers and video games) is a fact of modern life. The Kaiser Family Foundation survey, conducted in 2006, found that in a typical day 83% of children ages 6 months to 6 years use screen media averaging

about two hours per day. In their focus groups they found that some did not watch TV while others watched for many more than two hours. “Experts worry that time spent with media may detract from time children spend interacting with their parents, engaging in physical activity, using their imaginations, or exploring the world around them” (Rideout & Hamel, 2006, p. 4). Lack of nearby nature, technology, and a lessening of nondiscretionary time for children to play, all contribute to children’s lack of connection to nature. However, another contribution mentioned by numerous parents is safety.

Safety concerns. Safety concerns encompass several different topics from fear of strangers, to traffic, to hazards in the environment. Risk aversion has become the norm, but what is this doing to our children? “We have created a world for our children in which safety is promoted through fear” (Hillman & Adams, 1992, p. 31).

In 1990 Hillman and Adams (1992) surveyed the travel and activity patterns of English school children aged 7-11. The level of restriction on children’s independent travel was primarily a factor of age (younger children were not allowed as much independence as older children) and gender (girls were not allowed as much independence as boys). The results were also compared to a similar survey conducted in 1971. In 1971, three-quarters of the children were allowed to cross roads on their own compared to half in 1990, and the number of children allowed to go to places on their own in 1971 was twice as many as allowed in 1990. In 1971, 80% of 7 and 8 year olds were allowed to go to school on their own. By 1990 this number had dropped to 9%. The median age that children were permitted personal freedom and choice went from seven years old in 1971 to nine and a half in 1990. The surveys suggest that the increase in traffic is primarily responsible for the decrease in children’s independence, though fear of

molestation also features significantly. Parents reported that they felt they had far more freedom when they were young than they allow their children. “The rise in the volume of traffic and its accompanying noise, pollution, danger, and unpleasantness have contributed to a feeling of insecurity owing to the continuing retreat of street life and, at the same time, to a rise in the proportion of people outside the home who are strangers” (Hillman & Adams, 1992, p. 29). Ironically, the fear of traffic produces more car owners that transport their children, producing more traffic and a lessening of community (when there is more traffic you are less likely to know the people across the street). “The costs of increasing dependence on the car...[include] loss of local facilities to climate change at the global scale. One of these costs...is children’s freedom” (Hillman & Adams, 1992, p. 29).

Other fears that encroach on children playing in natural areas are the looming dangers that may be thought of as more risky than traditional playgrounds. However, Tim Gill (2005) suggests that:

The uncertainty and variation inherent in natural settings is part of what attracts us to them in the first place. Indeed in evolutionary terms, it is the unsurpassed ability of *Homo sapiens* to adjust to changes in our habitat that has, for better or worse, led us to be the dominant species on the planet...Which means that a bit of danger and uncertainty is actually good for you. (p. 2)

Our risk averse society is another example of our disconnection with nature, our attempt to control nature rather than understand it. Claire Warden (2010) distinguishes between hazards and risks in a natural play area. It is the role of the teachers to remove the hazards

in an outdoor environment, but not the challenges, “Be hazard aware, but not risk averse” (p. 107), which suggests being safe enough, but not safe as possible. She also suggests that teachers should include the children in the process of assessing risk in outdoor areas. “Children are better at managing the risks in natural settings than we give them credit for” (Gill, 2005, p.5). Many of the attitudes toward risk, although seeming to try and protect children, implicitly assume that the child is not capable, “that children [are] fragile, incompetent, accident-prone, unable to deal with adversity and incapable of learning how to look after themselves or to manage their own safety” (Gill, 2007, p. 38). The problem with this assumption is that children will never learn how to manage risk without being confronted with it. Tim Gill (2005) suggests that, “We face the prospect of a generation of children growing up at best indifferent to, or at worst terrified of, the world outside their homes, and who will then, as adults, pass on their fear of the outdoors to their own children” (p. 4).

The change in children’s time outdoors, increased technology that keeps children indoors, and safety concerns have all contributed to the high rates of obesity in children as well as a lack of connection to the natural world. The implication for children and society is even better understood when the benefits of nature for children are illustrated.

Indicators of the Benefits of Nature

A review of the literature about the benefits of nature for children illuminates positive effects from spending time in natural areas. Leading researchers have discovered health benefits, increased creative play and reduction in crime and aggression in urban areas, improved academic performance, and increased environmental awareness (Chawla, 1999; Faber Taylor & Kuo, 2006; Kuo, Bacaicoa, Sullivan, 1998; Kuo & Sullivan,

2001a, 2001b; Louv, 2005/2008; Tanner, 1980; Wells, 2000; Wells & Lekies, 2006). In addition, current brain research (Jensen, 2008; Medina, 2008) can be linked to nature experiences having a positive effect on brain development in young children.

Health benefits. Studies have provided evidence that the way people feel in pleasurable natural environments improves a person's quality of life (Faber Taylor & Kuo, 2006; Kuo et al. 1998; Louv, 2005/2008). Early experiences with the natural world have been positively linked with better health, emotional stability and creativity (Faber Taylor, Wiley, Kuo, & Sullivan, 1998; Fjortoft, 2001; Louv, 2005/2008). In a study that looked at the physical development of kindergarten children in Sweden, children that played in a natural forest area one to two hours per day were compared with children that played in a typical playground for the same amount of time. The motor development of the group that played in the natural area improved significantly more over a period of nine months than did the other group in all areas of motor development except flexibility, but particularly better in balance and coordination abilities (Fjortoft, 2001). The natural area afforded more opportunities for functional, symbolic, and construction play.

Studies show a reduction in symptoms of Attention Deficit Disorder (ADD) and Attention Deficit Hyperactivity Disorder (ADHD) when children are given the opportunity to play in natural areas (Faber Taylor, Kuo, & Sullivan, 2001a). There are several studies from the University of Illinois that have made this connection. Based on Kaplan's (1995) Attention Restoration Theory (ART) that suggests natural settings provide restorative experiences for reducing fatigue of directed attention, these studies looked at children with ADD and ADHD, their preferred play areas and the degree of their symptoms in each setting. Most of the study results were parent reports of their

children's behavior. But in one study the researchers used experimental methods to assess how a walk in the park, urban area, or suburb affected ADHD symptoms. The results were consistent across the different studies and pointed to natural areas being most effective in reducing symptoms of ADHD (Faber Taylor & Kuo, 2006, 2009, 2011; Faber Taylor, Kuo, & Sullivan, 2001a; Kuo & Faber Taylor, 2004). Additional studies suggest there is a positive link between near-home nature and three forms of self-discipline; concentration, impulse control, and delay of gratification, particularly in girls (Faber Taylor, Kuo, & Sullivan, 2001b).

Building on Kaplan's attention restoration theory, Kuo and Sullivan (2001a) compared levels of aggression for 145 urban public housing residents who were randomly assigned to buildings with varying degrees of nearby nature (trees and grass). Suggesting that the mitigation of aggression and violence was due to the restoration of mental fatigue through exposure to nature, those residents that had some nearby nature outside their apartments had significantly lower levels of aggression and violence than individuals living in barren conditions (Kuo & Sullivan, 2001a). In addition, this same phenomenon may account for fewer crimes in areas with a high density of trees and grass around the apartment buildings (Kuo & Sullivan, 2001b). Wells and Evans (2003) also found that high levels of nearby nature tend to buffer the impact of life stress on children, potentially due to the restorative effect of nature on attention resources. "A main effect of nature means such exposure directly affects health or well-being. A buffering effect means that nature attenuates the adverse effects of stressors or other adverse main effects on health or well-being" (p. 316). And nearby nature also contributed to the levels of play and the incidence of creative play for inner city children. These were found to be

significantly higher in spaces with more trees and grass than in barren spaces (Faber Taylor, Wiley, Kuo, & Sullivan, 1998).

Children are able to concentrate and increase their grades in school due to the introduction of green spaces and natural areas in their lives (Faber Taylor, Kuo, & Sullivan, 2001b; Wells, 2000). In addition, when children play outdoors they are more likely to have positive feelings about each other and their surroundings and have a stronger sense of community (Kuo, 2001).

Environment based education. Using the environment as an integrating context (EIC) across disciplines, also known as environment based or place based education, provides another type of benefit of children's connection with nature. EIC is a project approach to learning that uses real life experiences as the basis for problem solving, but these projects directly involve issues in the local community and natural surroundings. This approach usually includes interdisciplinary learning, child centered education, and team teaching approaches. Environment based education research has shown significant improvement in student academic performance when environmental activities are integrated into the curriculum (Glenn, 2000; Lieberman & Hoody, 1998). Case studies of five individual schools (throughout the United States) that adopted environmental education as the central focus of their academic program showed improvement (often dramatic) in reading, math, science and social studies scores (Glenn, 2000). In another study of 40 schools, other observed benefits of EIC programs included "reduced discipline and classroom management problems, increased engagement and enthusiasm for learning, and greater pride and ownership in accomplishments" (Lieberman & Hoody, 1998, p. 1). Students become actively involved in the community and increase their

confidence and desire to learn (Volk & Cheak, 2003). Another study evaluated the impact of an environmental education program on fifth and sixth grade students, their parents, and the community in Hawaii using quantitative and qualitative methods. The IEEIA (Investigating and Evaluating Environmental Issues and Actions) curriculum was used as an umbrella for all content areas. Out of 100 students, half participated in this program and the other half were in a traditional program. The students that experienced the IEEIA program appeared to be more skilled in critical thinking and more knowledgeable about ecology and the environment than the students in the traditional program. They also improved in reading, writing and oral communication skills and increased their confidence and self-esteem (Volk & Cheak, 2003). Much of the success of these students was attributed to a purpose driven curriculum, where “the program is not infused into the rest of the curricula but that the other subjects have been infused into the program” (Volk & Cheak, 2003, p. 22).

Significant life experience. In addition, it is more likely that an adult will spend more time in the natural environment and have a pro-environment attitude if he or she has been encouraged to spend time outdoors as a child (Bixler, Floyd, & Hammitt, 2002; Chawla, 1988, 1998, 1999; Thompson, Aspinall, & Montarzino, 2008; Wells & Lekies, 2006). Significant life experience research has explored these connections between spending time in nature as a child and adult environmental commitment. Research evidence suggests that childhood experiences with nature are associated with adulthood environmentalism (Chawla, 1998; Tanner, 1980; Wells & Lekies, 2006). Thomas Tanner (1980) surveyed 45 informed citizen activists of the National Audubon Society, National Wildlife Federation, The Nature Conservancy, and the Sierra Club to find out their

formative experiences. The results indicated a common experience, that of spending frequent, positive, time outdoors in pristine natural environments, either alone, or with friends, when they were young. The influence of an adult, often a parent or family member, was also significant. And witnessing the commercial development of their beloved places also contributed to many of the formative experiences. “Indeed, all the data in this study seem to support our long-standing hypothesis that children must first learn to love the natural world before they can become profoundly concerned with maintaining its integrity” (Tanner, 1980, p. 23). Recommendations that came out of this study suggested “the release of students, singly or in very small groups, to nearby wooded parks or vacant lots for two or three hours, frequently throughout their school careers... [where] the children would not always have to be given prescribed learning activities” (Tanner, 1980, p. 23). This new branch of research, known as significant life experience, spawned numerous studies over the next 20 years. Louise Chawla (1999) conducted interviews of environmentalists in Kentucky and Norway and found that “respondents repeatedly attribute their environmental interests or action to a similar set of sources: extended time spent outdoors in natural areas, often in childhood; parents or other family members; teacher or classes; involvement in environmental organizations; books; and the loss or degradation of a valued place” (p. 15). Wells and Lekies (2006) found that:

While involvement with “wild” and “domesticated” natural environments both play a role, participation with “wild” nature before age 11 is a particularly potent pathway toward shaping both environmental attitudes and behaviors in adulthood. When children become truly engaged with the

natural world at a young age, the experience is likely to stay with them in a powerful way – shaping their subsequent environmental path. (p. 13-14)

Bixler, Floyd & Hammitt (2002) also found that childhood play in wildland environments influences later interest in these places, environmental preferences, and occupations. They attribute the exploration in natural environments for providing “novelty, challenge, control, self-determination, and positive social interactions. At least for some children, environmentalism probably begins to emerge as a function of a positive affective attachment to wild places that provided enjoyable experiences and a sense of competency” (p. 800). Louise Chawla (2006) provides additional reasons why positive childhood experiences in natural areas may contribute to adult environmentalism.

When children have access to the natural world, and family members encourage them to explore it and give it close attention, they have a strong basis for interest in the environment. To turn this interest into activism, they later need to build on this foundation through education, membership in organizations, or the careers that they pursue; but from their childhood experiences in nature through their own free play and in the company of significant adults, they carry the memory that the natural world is a place of such full and positive meaning that it justifies their most persistent efforts to protect it. (p. 76)

Rachel Seeba (1991) investigated the environmental preferences and outdoor experiences of nearly 200 adults’ recollections when they were children and of almost as

many children's actual experiences. She found that nearly all the adults identified the outdoors as the most significant place in their childhood:

There is a connection between the quality of the child's experience and the way it is engraved in the memory as he or she matures: (a) An experience in which the child is actively involved, with his body, his senses, and his awareness, is likely to be etched in memory for a long time; and (b) the sympathetic attitude the child displays toward nature is likely to accompany the experience even when recalled in memory. (p. 395)

Nature and brain development. And finally, nature experiences can be positively linked to early brain development, especially since 85% of the brain develops in the preschool years (Bruner, Goldberg, & Kot, 1999). Current research suggests there are several principles that are important to brain development, and these can be experienced in the natural world. These include the need for exercise, what children attend to, stimulation of all the senses, and exploration (Medina, 2008). Eric Jensen (2008) suggests that enriched environments are the cornerstones of a brain-based classroom. "Enrichment is a biological response to a positive, contrasting environment in which measurable, global and synergistic changes occur" (Jensen, 2008, p. 199). And the natural world provides this type of environment best.

Gross motor development is developed in the natural world through climbing trees, balancing on logs, and walking on uneven trails. And these activities change as the seasons change. According to Jensen (2008), "the evidence is in that physical activity is good for kids" (p. 38). Both Jensen and Medina (2008) report that exercise enhances circulation of oxygen and nutrients to individual neurons, triggers the release of BDNF

(Brain Derived Neurotrophic Factor), a natural substance that boosts the ability of neurons to communicate with each other, stimulates the production of neurotransmitters (serotonin, dopamine, and norepinephrine) that are mood-enhancing and aid in the ability to remember content, and may even enhance the production of new cells in the brain (neurogenesis) (Medina, 2008).

Closely linked with the physical domain is learning through the senses. Senses are stimulated in the natural world through activities such as; listening to frog calls, touching plants, smelling flowers, watching birds, and tasting sap from a maple tree. The sensory input a child receives from natural objects stimulates all of the senses. “Many researchers believe that sensorimotor integration is fundamental to school readiness” (Jensen, 2008, p. 41). The rich environment of the natural world “inspires creativity in a child by demanding visualization and the full use of the senses” (Louv, 2005/2008, p. 7). Although learning through all the senses is important, Medina (2008) concluded that when interpreting our world, “vision trumps all other senses” (p. 221). “The brain is wired to pay attention to novelty, movement, intensity, contrast, and saturation...concrete vivid images are most influential” (Jensen, 2008, p. 55, 56). These words describe the opportunities found in the natural world.

We attend to things that provide a contrast to our normal environment. Everything in the natural world is constantly changing and therefore provides opportunities for novel learning. There is a strong link between attention and learning. “The messages that do grab your attention are connected to memory, interest, and awareness” (Medina, 2008, p. 75). As children explore the natural world they do so with great interest and attention. “The brain appears to be designed to solve problems related

to surviving in an unstable outdoor environment, and to do so in nearly constant motion” (Medina, 2008, p. 4-5).

“Emotionally charged events persist much longer in our memories and are recalled with greater accuracy than neutral memories” (Medina, 2008, p. 80). This is because the ECS (emotional competent stimulus) causes the amygdala (where emotions are created and maintained) to release dopamine into the system that greatly aids in memory retention. By focusing on “affect and intuitive knowledge...and the development of caring...toward other living things” (Wilson, R.A.,1993, p. 3) in the natural world, young children’s emotions are engaged. Since emotionally arousing events are better remembered than neutral ones and “emotional arousal helps the brain learn” (Medina, 2008, p. 94), when children make positive connections to the natural world that involve their emotions, more learning takes place. “Factors involved in meaning making are relevance, emotions, and context” (Jensen, 2008, p. 180). Authentic experiences in the natural world tend to be meaningful to children because they are relevant, can involve the emotions, and are contextually based.

It appears to be that our natural state is one of exploration, probably connected to survival. “Babies are born with a deep desire to understand the world around them and an incessant curiosity that compels them to aggressively explore it...they actively test their environment” (Medina, 2008, p. 264-265). Children develop cognitively by exploring the natural world and asking questions about what they find. Children need context for practicing cognitive skills and nature provides the context.

Summary

The lack of nature in the lives of young children has begun to take a toll on children's development and environmental stewardship. The body of research exposing this decline points to the need for early childhood programs to provide opportunities for children to be active and have experiences outdoors in natural areas:

In this regard, childcare centers offer an enormous opportunity for raising children in a “preventive environment” designed to support active lifestyles and healthy nutritional habits, connecting children and nature through design, beginning in the first year of life...Evidence of biophilia is readily observable, even by children under two – if their environment is designed to afford child-nature contact. (Moore & Marcus, 2008, p. 162-163)

There are new organizations (founded within the past six years) that focus on connecting children with nature. “The children and nature movement is fueled by this fundamental idea: the child in nature is an endangered species, and the health of children and the health of the Earth are inseparable” (Louv, 2005/2008, p. 355). Richard Louv co-founded the Children and Nature Network (C&NN) as a movement to “connect all children, their families and communities to nature” (Children and Nature Network, n.d.). They encourage this reconnection to nature by linking research and resources to people and organizations. A second faction, the Nature Action Collaborative for Children (NACC), is a grassroots organization working to connect a diverse group of disciplines including early childhood educators, environmental educators, and landscape designers worldwide to “re-connect children with the natural world by making developmentally

appropriate nature education a sustaining and enriching part of the daily lives of the worlds' children" (Nature Action Collaborative for Children, n.d.). Backed by the World Forum Foundation and part of the Clinton Global Initiative, NACC is working to connect 2 million young children with nature. They organized several conferences for networking the diverse professions and have mobilized community teams in 93 countries to lead local campaigns to meet this goal. And lastly, the emergence of ECO schools (for K-12 grades), backed by the National Wildlife Federation, provide a set of standards that require schools, among other things, to take children outside on a daily basis (National Wildlife Federation, n.d.).

The formation of these groups and the increase of studies over the past several years extolling the benefits of nature for children has propelled a movement to connect children with nature that is collecting steam. This and the knowledge that "children learn best not what they are told, but what they actively experience for themselves and make their own through autonomous use" (Hart & Chawla, 1981, p. 281) and the fact that "children care about nature more when they are more familiar with it, at a time when this opportunity is becoming less and less available" (Chawla, 1988, p. 19) provide an emphasis for the need for early childhood environmental education programs, particularly nature preschools.

The Intersection of Early Childhood and Environmental Education

Attention on early childhood environmental education has been growing over the past 20 years. Julie Davis (1998), co-founder of the Queensland Early Childhood

Environmental Education Network in Australia, described the linkages between early childhood and environmental education:

Early childhood education and environmental education are in accord.

Both fields embrace ideas of ‘wholism’ and *connected* ways of viewing the world. Both fields place integrated curriculum approaches as central, with practical and relevant experiences for learners as most appropriate.

Both fields hold strong commitments to democratic practice and the facilitation of supportive environments for living and learning... Both recognize the importance of personal empowerment and advocacy as critical for learners, teachers, and the profession. (p. 120)

The rationale for including environmental education in early childhood is based on the premise that “children must develop a sense of respect and caring for the natural environment during their first few years of life or be at risk for never developing such attitudes...[and] that positive interactions with the natural environment is an important part of healthy child development” (Wilson, R. A., 1996, p. 1-2). Ruth Wilson (1994), founder of the Environmental Education for Preschoolers network in the United States, although not a current network, described the rationale for early childhood environmental education (ECEE) in more detail in the following:

Environmental education at the early childhood level has the potential for greatly enhancing the development of the young child. It fosters an appreciation of beauty and diversity and fosters growth in all the developmental domains (i.e., physical, mental, social, emotional, and spiritual). Involvement with the natural environment stimulates the senses,

fosters observational and critical thinking skills, provides innumerable topics for conversation, invites physical manipulation, and stimulates the imagination and sense of wonder... Environmental education at the early childhood level has the potential for developing an environmentally concerned citizenry that will relate to the earth in a more harmonious way than that of the present generation. (p. 23-24)

Nature education offers experiential learning opportunities that influence attitude development in young children (Wilson, R. A., 1996; Tilbury, 1994). And as environmental education addresses, “both affective appreciation and cognitive understanding...at the early childhood level, a far greater emphasis should be on affective appreciation than on cognitive understanding” (Wilson, R. A., 1994, p. 24).

In summarizing the research on children and ecology, Stewart Cohen (1992) suggests that creating an ecologically based learning environment for young children needs to be “research based and predicated on sound pedagogical principles. In young children, ecologically based learning should be developmentally appropriate, occur across real settings, and involve children’s active participation” (p. 21).

Embracing developmentally appropriate practices and activities based on child development and the cognitive abilities of preschool children, environmental education as education *in*, *about*, and *for* the environment can be very effective. As preschool programs have begun to integrate environmental education into their programs, they typically focus on education *in* and *about* the environment (Davis, 2010). Allowing children to explore natural outdoor settings and opportunities to learn about natural systems like the water cycle are examples that fill these roles. But education *for* the

environment has typically not been intentionally offered. However, as we move towards education for sustainability, education *for* the environment becomes more important, especially at a younger age. Early childhood education for sustainability (ECEfS) is a newer concept suggested by Davis (2010). She argues that, “ECEfS is not ‘doom and gloom’ education. It is *transformative education* that values, encourages and supports children to be problem seekers, problem solvers and takers of action in their own environments” (p. 31). In recommending that early childhood take on the mantle of sustainability Davis (2010) provides this definition, “ECEfS is the enactment of transformative, empowering and participative education around sustainability issues, topics and experiences within early education contexts” (p. 28) and suggests a theoretical framework that includes three underpinnings of ECEfS. These are a broadly-based rights dimension that recognizes the United Nations Convention of the Rights of the child, a child competency dimension that recognizes that children are capable and have capacities for shaping their worlds, and a participatory and activist dimension promoting “environmentally conscious citizenship that helps even preschool-aged children to challenge unsustainable thinking and practices, and includes them in putting ideas into action” (p. 37). Young children are capable of responding to ecologically formulated inquiries (Cohen & Horm-Wingerd, 1993). They “are aware of ecological events and appear to recognize the significance of such issues at a level commensurate with their existing knowledge and concern” (Cohen & Horm-Wingerd, 1993, p. 116). In order to transform our world to be more sustainable, Julie Davis (1998) concludes, “the challenges are great, but with an environmental education perspective in early childhood

and early childhood practices informing environmental education, I believe we can create positive change for better futures” (p. 122).

Forest Schools

One example of combining early childhood and environmental education is the forest school, many of which are located in Europe. They come from a tradition of outdoor education in Sweden beginning in the 1950s where children learned to ski and ice skate. Gosta Frohm from the *Association for Promotion of Outdoor Life* developed this concept in 1957 and called it *Skogsmulle* (outdoor school that introduced an imaginary forest creature) (Robertson, 2008). Forest schools, at that time, gave children the opportunity to “learn about flora and fauna, environmental protection, and camp life” (Anggard, 2010, p. 8). Children were provided outdoor activities that were fun and included “playing, singing and fantasizing about animals and plants of the forest...involving imaginary characters... [like] the troll Mulle, a forest creature who is made from the material of the forest” (Anggard, 2010, p. 8). Over the decades to follow, the children’s own experience became important as they explored natural areas using magnifying lenses and were encouraged to collect natural materials while learning through their senses.

I Ur och Skur, translated as “all weather” or “rain or shine” preschools, a more integrated approach to forest schools where the children are outside 80% of the time, started in Scandinavia in the mid-1980s:

The pedagogy is based on the conviction of the founders that “children receive help in their development from things found in nature. They learn to crawl, jump, balance and climb on fallen trees and mossy rocks...

Children get a feeling of togetherness as they listen to fairy tales under a tree whilst sharing a picnic. Their senses are trained by tasting, smelling, touching, looking, listening and comparing anything that can be found in a meadow, woodland or lake. Curiosity and an inquiring mind soon become directly stimulated when children are outdoors. Every caterpillar, beetle or flower can provoke a cluster of questions and thoughts. All this helps children in I Ur och Skur schools to attain a built-in feeling for nature which will last a lifetime. (Robertson, 2008, p. 5)

There are now more than 180 of these types of forest preschools in Sweden (Robertson, 2008). “Their aim is to give children knowledge about nature, to make them aware of the environment and help them acquire a feeling for nature...Nature awareness education is mediated through play and pedagogy characterized by exploration” (Anggard, 2010, p. 7).

In an ethnographic study of a forest preschool in Sweden, Eva Anggard (2010) observed 18 children (3-5 years old) and 14 children (1-3 years old) with three leaders for each group. The preschool is located 50 meters from the edge of a wood. Nearly all of their time is spent outdoors (60% in the woods and the rest in the preschool yard). Each group has a base place near the preschool that includes a log ring for gatherings and snacks and environments are intentionally chosen to provide challenges for each age group. Each group is divided into smaller forest school groups of around five children with one leader. They walk to the forest and spend up to three hours exploring at least once a week. Anggard (2010) observed the school using nature in three ways that included:

As a classroom where children learn about nature in different ways, as a home – a peaceful place in which to eat, sleep, socialize and play, [and] as an enchanted world – a fairyland populated by fairy figures and animals with human traits...Something that permeates all three ways of presenting and using nature in the Swedish preschool described here is a wish to create a *feeling* for nature in children...Further, there is a notion that the children will experience a feeling of wholeness and harmony through sensory experiences in natural environments. (p. 10, 22-23)

It is also felt that providing this type of environment for young children produces a “robust child who can cope with hardships and take responsibility for his/her own well-being” (p. 21) specifically by making the wild and unpredictable natural world more homelike and by mastering the difficulties of being outdoors. This school provides an authentic environment and experience-based learning where children discover that the outdoors provides opportunities to *learn* about nature, to *be* in nature and to *protect* nature as a site for wildlife (Anggard, 2010).

In the mid-1990s the forest school approach began in Britain as a result of nursery school educators visiting a forest school in Denmark (O’Brien & Murray, 2006). Forest School has been defined in Britain as “an inspirational process that offers children, young people and adults regular opportunities to achieve, and develop confidence through hands-on learning in a woodland environment” (O’Brien & Murray, 2006, p. 4). Participatory action research was conducted in two phases to learn more about the forest school approach and its impact on children of different ages. The first phase was undertaken in Wales in 2002-2003 and the second in England in 2004-2005. Several

approaches, schools, and ages of children were included. The researchers found that forest school provided many benefits for the children that participated, including increased confidence and self-esteem, language and communication, motivation and concentration, physical skills, pro-social behavior, and a closer relationship with and better understanding of the outdoors (O'Brien & Murray, 2006).

More recently, forest kindergartens have been developed in Scotland, and the Forest Schools initiative has trained a network of practitioners to provide these experiences. Many of the preschools are adopting the approach where the children spend a session per week in a wooded area. A few nature kindergartens have emulated the Swedish model, and the children spend nearly 80% of their time outdoors (Robertson, Martin, Borradaile, & Alker, 2009).

Forest kindergartens (or *Waldkindergartens*) are even more prevalent in Germany with approximately 700 programs where children spend 90% of their time outdoors year-round (Esterl, 2008). A limited number of programs have emulated this approach in the United States, specifically in Portland, Oregon; on Vashon Island, Washington; Saratoga Springs, New York; and Natick, Massachusetts.

The Nature Preschool

At the time Ruth Wilson started writing about early childhood environmental education in the early 1990s, there were fewer than half a dozen nature preschools in existence in the United States. Many nature centers provide early childhood programs and several preschools include nature experiences in their programming, but the nature preschools that were government licensed and operated by a nature center were few and included preschools in Connecticut, Massachusetts, and Michigan. Today there are more

than 20 nature preschools throughout the United States. The length of time they have been in existence ranges from less than one year to over 40 years. The programs are diverse, in that they range from very small (one class) to large (three classrooms with multiple classes). They can be found throughout the United States (in the Northeast, Midwest, South, and Northwest). The directors' backgrounds vary, sometimes with both early childhood education and environmental education experience, but usually having either one or the other (Bailie, et al., 2009). The common thread throughout these preschools is their nature-focused curriculum that includes extensive time spent outdoors in natural areas.

Typically, the curriculum at a nature-based preschool builds on the premise that children are intrinsically motivated to learn. The natural world encourages discovery and experimentation with the opportunity for divergent thinking and reflection. By positively connecting young children to the natural world, a love of nature is instilled that will help foster an environmental ethic and caring attitude that will follow them throughout their lives (Wilson, R. A., 1993). Nature permeates the children's experiences and becomes a vehicle for children's development in all domains. Nature-based activities happen indoors and outdoors; in whole group activities, small group activities, and individual activities; at the preschool site and on the nature center grounds in a variety of habitats; and as planned, teacher-driven activities, child-initiated activities, and spontaneous activities. Children make discoveries and learn through play, make choices and follow their own interests, use their senses and problem-solve with concrete applications (Bailie, 2010). The goals of the nature curriculum often include developing curiosity about the natural world, observation skills, appreciation of the beauty of nature, willingness to use all the

senses to make discoveries, understanding of self and relationship to the natural world, understanding natural phenomena and concepts, drive to experiment, and ability to communicate about nature (Schlitz Audubon Nature Preschool, 2006).

Although there are a few studies about forest schools and the impact they have on children, there has been little research on nature preschools. One study looked at former participants of a nature preschool program at Kerry Wood Nature Centre in Canada to ascertain if the program instilled lasting pro-environmental behaviors in children (Robertson, 2008). Although not a nature center based preschool according to the definition, children in this program attend twice a week for at least one month. However, the participants that were chosen attended the nature nursery for at least three sessions (fall, winter, spring). These participants were 10-12 years old at the time of the study. Robertson interviewed former participants, their families, and a control group about their current environmental attitude and behaviors. He also administered the *Connectedness to Nature Scale* (Mayer & Frantz, 2004), thus providing a mixed methods approach. Robertson (2008) concluded that “the attitudes formed by early childhood environmental education program seem to persist, especially if supported by family or other social influences...Nature Nursery children had a stronger connection to the environment than did their peers” (p. 62). Of interest is that “opportunity emerged as a potentially important factor in shaping children’s environmental attitude” (p. 63), in terms of physical location (accessible place to play in a natural setting), time (free time), companionship (alone, with peers, or adults), and parenting (fears keeping children from going outside).

More recently, Julia Torquati and Ruth Wilson (in process) have looked at young children’s affinity for nature and conservation knowledge and attitudes and whether these

are related to the type of preschool they attend. Although the data are still being analyzed, in the most recent comparison, the researchers found that children attending a nature preschool have higher biophilia scores (scores resulting from a Biophilia Interview, where the higher scores reflect an affiliation with life-like processes) than those attending a traditional preschool. Children attending a nature preschool were also more likely to cite harm to nature and anthropocentric concerns as justifications for conservation values, whereas children attending a more traditional preschool cited social conventions more often. In an earlier study, the same researchers looked at the influence of experience in a nature preschool on children's development and conservation attitudes. Specifically, on the nature-focused preschool's ability to promote holistic child development, enhancing brain development in four critical areas (physical activity, observational skills, attention/awareness, and exploration) and the preschool's ability to enhance conservation attitudes. Although only one nature preschool was studied, the findings indicated that this nature preschool did promote holistic child development (including those necessary for healthy brain development) and a conservation attitude (Torquati & Wilson, 2011). However, these studies have focused on one nature preschool and in the 2011 study, no control group was used.

The limited number of nature preschool studies, to date, have centered on how well they support the development of conservation values and observations on how nature experiences promote holistic child development. However, no studies have looked at what the programs actually do or if they are consistent across schools.

Summary

Environmental education and early childhood education have been partners for over a hundred years. There are several common threads weaving through early childhood education and environmental education. These are; experiential learning that is sensory based, a child-centered approach to the curriculum, authentic experiences, an integrated curriculum, attention to the whole child, and active learning. A purpose driven curriculum that is child-centered, teacher facilitated, and academically integrated has shown to be advantageous for the goals of early childhood education and environmental education. However, the goals of each discipline differ. Early childhood education is based on child development. So the purpose of nature education in early childhood is to help foster development in all domains of childhood. The purpose of environmental education for young children is to encourage an environmental ethic so children will learn to love the earth in order to care for it when they grow up.

At the intersection of early childhood education and environmental education is the nature preschool. And like the early kindergartens that began in the mid to late 1800s, nature preschools today may lack a consistency of approach because they have sprung up independently, modeled after child development or environmental education, depending on the background of their directors and nature center leadership. The difficulty of finding competent teachers is mentioned in numerous references throughout both disciplines, but especially in regard to nature education. And this is true of nature preschools, as well.

To date, research on nature preschools (which is very sparse) have primarily focused on conservation values and attitudes. No research has been conducted to learn

more about the practices nature preschools employ to integrate early childhood education and environmental education goals in teaching young children. And the quality of nature preschools is in question as little is known about their methods and appropriateness of their practices.

Theoretical Framework

At the core of this study is an exploration of the practices of nature center based preschools, specifically how they integrate early childhood education and environmental education goals in teaching young children. On the periphery, but potentially influential, are all the elements that inform and impact the core program. The research questions outlined in Chapter 1 help to identify these elements. The review and critique of the literature combined with my own experience and insights have contributed to developing a theoretical or conceptual framework for the design and conduct of this study. The theoretical framework helped to focus the research process and design by providing an organizing structure for analyzing, interpreting, and reporting my findings. Each of the categories of the theoretical framework is directly derived from the study's research questions. Theories that influenced the conceptual framework for this study include Stephen Kellert's (2002, 2005) theoretical framework for connecting nature and childhood development, NAEYC developmentally appropriate practice (Copple & Bredekamp, 2009), the principles of interpretation (Beck & Cable, 2011; Tilden, 1957/1967), and NAAEE guidelines for excellence in early childhood environmental education (NAAEE, 2010).

The first research question seeks to understand how nature center based preschools integrate child development and environmental goals in teaching young children. Therefore, the logical conceptual category to capture responses to this question is “Integration of Early Childhood and Environmental Education Goals”, including both categories; development of the whole child, and development of an environmental ethic. Development of the whole child includes ways that nature preschool programs provide opportunities for physical, social, emotional, cognitive, and spiritual development in young children using the natural world. Integral to these activities are opportunities to care for and about the natural world. Underlying this category is Stephen Kellert’s (2002, 2005) proposed theoretical framework for connecting nature and childhood development that involve three kinds of contact with nature – direct, indirect, and vicarious experience (also expressed as modes of experience) – and three modes of learning – cognitive, affective, and evaluative (Kellert, 2005). Direct experience with nature is exactly as it sounds, direct contact with animals, plants, and habitats. These are spontaneous and unsupervised occurrences that happen in natural areas, such as a forest, creek, park, or even a child’s backyard. Indirect experience with nature, although involving contact, happens in controlled environments under supervision by adults. These can be programs at zoos, museums, or nature centers, or involve pets, or gardening. Vicarious experiences of nature does not involve contact, but instead representations or images of nature, such as through picture books, fairy tales, television programs, and movies (Kellert, 2005). Each of the modes of learning follow a developmental progression in child development, moving from concrete perceptions to abstract experiencing, from the personal to other person interests, from local to global outlooks, “Predominantly emotional and affective

values of nature emerge earlier than more abstract, logical, and rationally deduced perspectives (Kellert, 2002, p. 132). Kellert connects the cognitive mode of learning to Bloom's taxonomy of cognitive development and the affective mode to Krathwohl's taxonomy of emotional development. These each have levels of development that range, in the case of cognitive development, from knowledge to evaluation, and in the case of emotional development, from responding to valuing. He connects evaluative development to a set of biophilic values of nature that range from aesthetic (curiosity and imagination) to utilitarian (comfort in nature). Kellert (2005) suggests that young children, under the age of six, focus on developing the utilitarian, dominionistic (independence and self-confidence), and negativistic (assessing risk) biophilic values of nature first:

These values reinforce a child's sense of physical and material security and the avoidance of threat and danger. Although not absent during this period, affection for nature is subordinated to the more fundamental concerns for safety, sustenance, and security. The very young are anxious about direct and uncontrolled contact with nature, with the exception of restricted contact with highly familiar creatures and settings. (p. 76)

Each of the categories of values of nature begins to develop with particular ages of children. The three that Kellert (2005) contends belong to early childhood do not preclude the others, but he suggests are more important for this age. From an early childhood standpoint, feeling safe and secure is important. However, opportunities for exploration and discovery within those confines can also exist. Kellert (2002, 2005) also suggests that nature center visits are considered indirect contact with nature. And

generally this is true. However, nature preschools offer a more direct experience with nature for young children that is safe and secure, but allows for spontaneity, challenge, and relevancy. “Both theory and evidence support the view that direct, ongoing experience of nature in relatively familiar settings remains a vital source for children's physical, emotional, and intellectual development” (Kellert, 2005, p. 81). Discovering if and how nature preschools provide direct experiences with nature for young children (as Kellert defines it) is a fundamental part of this question.

The second research question seeks to describe high quality practices of nature preschools. The category entitled “High Quality Practices” is all encompassing and thus appropriate. The filters that are used to better understand these practices in a nature preschool are developmentally appropriate practice (DAP) (Copple & Bredekamp, 2009), principles of interpretation (POI) (Beck & Cable, 2011; Tilden, 1957), and the NAAEE guidelines for excellence in early childhood environmental education (ECEE) (NAAEE, 2010). In order to better understand these practices, principles and guidelines, Table 2.1 compares the ideas inherent in each.

Table 2.1 Comparison of DAP, POI, and ECEE Guidelines

DAP	POI	ECEE
Whole child focus	Whole person focus	Whole child focus
Play based	Inspirational, passion	Play and exploration based
Age, individual, culturally appropriate	Children's program different than adult	Address individual capabilities culturally appropriate
Intentional practices	Intentional programs	Authentic experiences
Meet children where they are	Relate to the experience of the audience	Make connections to previous experience
Child centered	Provocation, not instruction	Child directed & inquiry based
Professional development and preparation	Continually developed knowledge and skills	Educator preparation
Research based – child development	Well researched programs	Based on research, theory, & experience
	Encourage resource preservation	Curriculum framework for environmental learning
		Outdoor places and spaces

There are common ideas among the three practices, principles and guidelines that are useful in this discussion. All three address the whole child in some way. DAP refers to all domains of early childhood, while POI refers to presenting a complete theme to the whole person, and ECEE guidelines can be used to plan programs “with the whole child in mind” (NAAEE, 2010, p. 21). Play is important for young children and programs that provide opportunities for play are DAP and follow the ECEE guidelines. POI does not talk about play, per se, but they value inspiration and passion over providing only information. The ECEE guidelines go beyond DAP to include exploration of the outdoor world as a fundamental part of the guidelines. Understanding that programs for children are fundamentally different from those provided for adults, all three frameworks address the age, individual, and cultural needs of children. Each framework provides either intentional practices, intentional programs, or authentic experiences and puts forward the

understanding that meeting children where they are and relating to their past experiences is important. DAP and ECEE guidelines are child centered and child directed while POI values provocation over direct instruction. And ECEE guidelines include inquiry based programming. All three are either research based or use research to design programs and they all provide a value of professional development of teachers. However, the educator preparedness varies depending on the discipline. DAP is mainly concerned with knowledge of child development. POI with knowledge and skills related to the topic of interpretation and ability to communicate it. But ECEE guidelines combine both DAP and POI by addressing the needs of teachers to have foundations of early childhood and environmental education. However, only POI and ECEE guidelines encourage resource preservation and contain a curriculum framework for environmental learning. And only the ECEE guidelines focus on outdoor physical spaces and places as being essential. Although these guidelines go further than the other two in combining early childhood and environmental education, they may not go far enough. The need for more wild areas in young children's lives, providing that direct connection to nature as defined by Kellert (2005), is not addressed. This, in particular, is what nature preschools can offer. Once high quality practices are identified and described, it is also of interest to determine how consistent these practices are across the various programs.

The third research question is intended to uncover how directors incorporate elements of quality practice into their programs. Hence, the appropriate categorization is "Incorporating Elements of Quality Practice". Understanding how these practices are incorporated in each of the nature preschools involves looking at the practices

inherent in a nature preschool, outcomes associated with these practices, and then identifying the approach being used.

The fourth research question seeks to identify the program goals the director established and how these inform the environment and experiences provided for the children. Therefore, “Program Goals” is an appropriate category, specifically looking at how these program goals affect the curriculum choices, the physical space used, selection of teachers, and the experiences provided.

Research questions five and six attempted to get at the factors that either informed or impacted the nature preschools; thus, “Factors that Inform the Programs” and “Factors that Impact the Programs” are appropriate categories. Factors that inform the program may include such things as preschool philosophy (e.g., Montessori, Reggio Emilia, Waldorf), nature center mission and resources, and the director’s background (e.g., early childhood education, environmental education). Factors that impact the programs may include such things as parent expectations, teacher backgrounds, nature center policies, physical space, and kindergarten readiness. Individual nature preschool programs may be influenced more or less based on regional assumptions and expectations.

Research question seven looks at nature preschools as providing unique teaching methods that can inform teaching and learning. Therefore, an appropriate category is “Teaching and Learning.” Experiential education, intentional teaching methods, and the role of the outdoors in teaching young children may influence this category. How the directors feel about their programs and their willingness to share their approaches, their impression of how their graduates are doing in kindergarten, and the degree to which the

staff feel connected with other nature preschools around the country, may also influence this category.

To further explain each of the categories, I drew on the literature and my own experience about potential responses to the research questions. Figure 2.1 outlines the theoretical framework that was developed for this study.

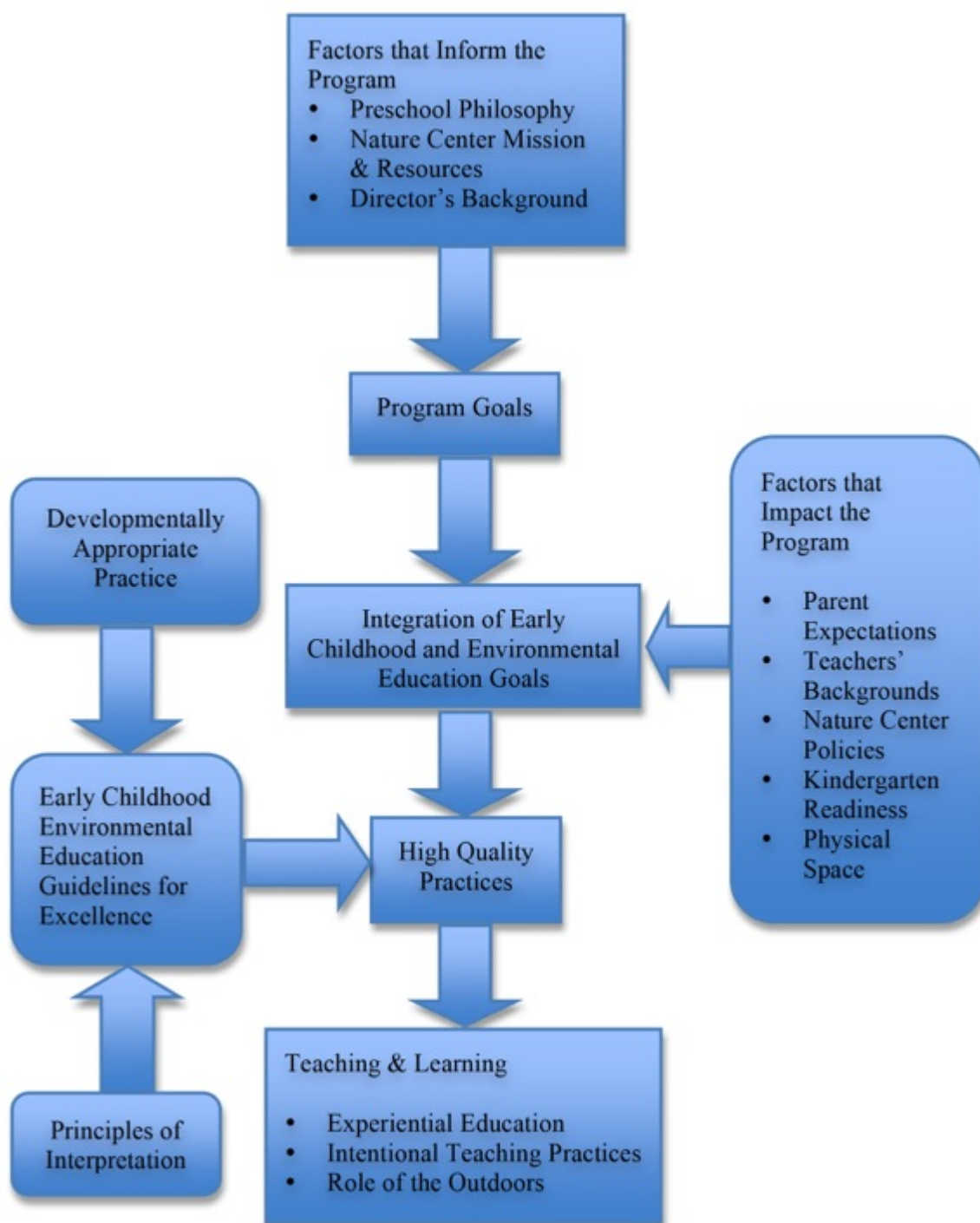


Figure 2.1 Conceptual Framework for Nature Center Based Preschools

CHAPTER 3 METHODOLOGY

Introduction

The purpose of this multiple case study was to explore, with a sample of preschool directors at nature center based preschools, how these preschools integrate child development and environmental education goals in teaching young children. I believed that a better understanding of these practices could provide nature preschool staff with the tools they need to put into action high quality standards for early childhood environmental education, resulting in consistency across programs. To illuminate the exploration, the study addressed seven research questions: (a) In what ways do nature center based preschools integrate child development and environmental goals in teaching young children? (b) What do high quality practices in nature center based preschools look like and are they consistent across programs? (c) How do directors in nature center based preschools incorporate elements of quality practice in their programs? (d) What goals do directors of nature center based preschools have for their program and curriculum and how do these inform the environment and experiences they provide for the children? (e) What informs the program and curriculum? (f) What impacts the program and curriculum? (g) What can be learned about teaching and learning from nature center based preschool programs?

This chapter describes the study's research methodology and includes discussions around the following areas: (a) rationale for the research design; (b) description of participants; (c) data collection procedures; (d) data analysis procedures; (e) role of the researcher; (f) methods of verification; and (g) ethical considerations. This chapter culminates with a brief concluding summary.

Assumptions and Rationale for a Qualitative Design

Qualitative research has as its defining characteristics that it is holistic, empirical, interpretive, and empathetic (Stake, 1995). It is holistic in that it resists reductionism and is “relatively non-comparative, seeking to understand its object more than to understand how it differs from others” (Stake, 1995, p. 47). It is empirical in that it is naturalistic which means field oriented, emphasizing things that are observable and information received from informants. It is interpretive in that researchers rely more on intuition than on facts, and the researcher-subject interaction is a part of the research. And it is empathetic in that its design is emergent (although planned), responsive, and progressively focused (Stake, 1995). “In addition to its orientation away from cause and effect explanation and toward personal interpretation, qualitative inquiry is distinguished by its emphasis on holistic treatment of phenomena” (Stake, 1995, p. 43). Qualitative researchers use naturalistic observation as their

primary medium of acquaintance. When they cannot see for themselves, they ask others who have seen. When formal records have been kept, they pore over the documents. But most of them favor a personal capture of the experience so, from their own involvement, they can interpret it, recognize its contexts, puzzle the many meanings while still there, and pass along an experiential naturalistic account for readers to participate themselves in some similar reflection. All research is a search for patterns, for consistencies. (Stake, 1995, p.44)

To expand on these ideas, Creswell (2007) suggests that qualitative research include the following: it is conducted in a natural setting as data is collected in the field;

the researcher is the key instrument collecting the data through interviews, observations, or document review; multiple sources of data are collected; inductive data analysis is used building patterns and themes from the “bottom up”; participants’ meanings are important; the research process is constantly emerging; a theoretical lens is sometimes used; interpretive inquiry is used where the researchers make an interpretation of what they observe; and a holistic account of the problem or issue under study is developed. “The procedures of qualitative research, or its methodology, are characterized as inductive, emerging, and shaped by the researcher’s experience in collecting and analyzing the data” (Creswell, 2007, p. 19).

Merriam (1998) suggests that, “questions about process (why or how something happens) commonly guide qualitative research, as do questions of understanding (what happened, what does it mean for those involved)” (Chapter 3, “The Research Problem”, para. 11). This study is an exploration of practices at nature center based preschools. I felt that a purely quantitative design would not elicit the type of data necessary to explore and acquire a deep understanding of the research problem. Creswell (2007) asserts that, “we conduct qualitative research because a problem or issue needs to be explored... [and] we need a *complex*, detailed understanding of the issue” (p. 39, 40). I also wanted to be able to use my own experience in this field in an acceptable way and work together with the nature preschool directors to construct what high quality practices look like at nature center based preschools. Stake (1995) suggests that there are “three major differences in qualitative and quantitative emphasis [that] deserve attention: (1) the distinction between [understanding and] explanation...as the purpose of inquiry; (2) the distinction between a

personal and impersonal role for the researcher, and (3) a distinction between knowledge discovered and knowledge constructed” (p. 37).

Rationale for a Case Study Design

Within the framework of a qualitative approach, this study was suited to a case study design. Creswell describes case study research as, “the study of an issue explored through one or more cases within a bounded system (i.e., a setting, a context)” (p. 73). In this study the bounded system is the nature center based preschool program. And the issue is how these programs integrate early childhood and environmental education goals in teaching young children. Yin (2009) asserts that “case studies are the preferred method when (a) ‘how’ or ‘why’ questions are being posed, (b) the investigator has little control over events, and (c) the focus is on a contemporary phenomenon within a real-life context” (Abstract, para. 2). Stake (1995) suggests that, “the cases of interest in education and social service are people and programs... We are interested in them for both their uniqueness and commonality... We would like to hear their stories” (p. 1). Nature center based preschools are unique educational programs that have not been studied. Therefore, they lend themselves to a case study design. As Merriam (1998) explains:

A descriptive case study in education is one that presents a detailed account of the phenomenon under study... They are useful, though, in presenting basic information about areas of education where little research has been conducted. Innovative programs and practices are often the focus of descriptive case studies in education. Such studies often form a

database for future comparison and theory building. (Chapter 2, “Overall Intent”, para. 2)

The role of the researcher in qualitative case study is one of ongoing interpretation. Insight and discovery rather than hypothesis testing are valued (Merriam, 1998; Stake, 1995). “The qualitative researcher relies partly on coming to know personally the activity and experience of the case” (Stake, 2006, p. 3). Therefore, my expertise and experience with nature center based preschools were an asset for case study research.

Case study research relies on multiple sources of evidence such as interviews, observations, documents and artifacts, enabling the data to converge in a triangulating manner (Yin, 2009). These multiple sources of evidence were collected in order to document the innovative nature center based programs. Stake (1995) suggests that, “an innovative program may be a case... The case is a specific, a complex, functioning thing... The case is an integrated system” (p. 2).

Rationale for a Multiple Case Study Methodology

“In multicase study research, the single case is of interest because it belongs to a particular collection of cases. The individual cases share a common characteristic or condition. The cases in the collection are somehow categorically bound together” (Stake, 2006, p. 4-6). Stake (2006) calls this group a “quintain”. “A quintain is an object or phenomenon or condition to be studied – a target...In multicase study it is the target collection” (Stake, 2006, p. 6). A quintain can be a program that operates at several sites. A nature center based preschool is a program that operates at many sites, but each site

may vary based on a number of variables (e.g., nature center, director, teachers, curriculum). “To understand it, [the quintain] better we study some of its single cases – its sites or manifestations. But it is the quintain we seek to understand. We study what is similar and different about the cases in order to understand the quintain better” (Stake, 2006, p 6). Multiple case study research provides an opportunity for generalization if enough cases are included. “The more cases included in a study, and the greater the variation across the cases, the more compelling an interpretation is likely to be. The inclusion of multiple cases is, in fact, a common strategy for enhancing the external validity or generalizability of your findings” (Merriam, 1998, Chapter 2, “Multiple Case Studies”, para.1).

This study utilized qualitative multiple case study research. Eight individual cases were employed, chosen using maximum variation sampling. Understanding each of the individual cases first enabled me to better understand the “quintain” or the nature center based preschool program as a whole. Identifying quality practices of this program was possible by studying several cases. In this way, opportunities to support or challenge assumptions were readily available.

The Research Sample/Participants

A purposeful sampling procedure was used to select the research sample. Purposeful sampling is the method of choice for qualitative case study methodology in order to yield the most information about the research problem (Merriam, 1998; Stake, 1995). “Purposeful sampling is based on the assumption that the investigator wants to discover, understand, and gain insight and therefore must select a sample from which the

most can be learned” (Merriam, 1998, Chapter 3, “Sample Selection”, para. 2). The criteria used for selection of the participants were that all participants were nature center based preschool directors (for a minimum of 3 years) and had participated in a previous survey about nature center based preschools in the United States (Bailie et al., 2009). In order to get a range of experience and perspectives, maximum variation sampling based on certain distinguishing characteristics was used to select the individual cases. “For multicase or comparative case studies you would select several ‘cases’ based on relevant criteria. One of the criteria might be that you want as much variation as possible; hence, you would be employing a maximum variation sampling strategy in the selection of your cases” (Merriam, 1998, Chapter 3, “Sample in Case Studies”, para. 3).

Eight directors of nature center based preschools were asked to participate in this research study. The sample was selected so that the perspectives of directors with differing experience, as well as size and longevity of the program, were obtained. Factors that were included are: (a) experience of the directors (early childhood vs. environmental education); (b) longevity of the program (five years or more vs. less than five years); and (c) size of the program (one classroom vs. multiple classrooms). Equal groups of each factor are represented (see table 3.1). Four of the directors have either an early childhood or elementary education background. The other four have environmental education backgrounds. Three of the four directors with environmental education backgrounds also have either an early childhood or elementary education background, as well. Four of the programs were older than five years (6, 10, 34, and 43 years) at the time of the study and the other four programs were in operation less than five years (3, 3-1/2, 4, and 4-1/2 years). Four of the programs have one classroom and the other four have multiple

classrooms (two or three). Five of the directors also taught in the program. The other three did not teach because of other responsibilities or because the program was too large to both teach and supervise it. One of the directors that did not teach was an administrator of a parent cooperative. The lead teacher at that site had actually started the program prior to it becoming part of the parent cooperative. Because of her knowledge of the program, the lead teacher participated in the interview as well. The main purpose of including these different factors was to get as much variation as possible among nature center based preschools. A side effect of including these different factors was gaining a deeper understanding of how the director's background informs the program, lessons learned from programs with more experience, and what, if any, affect the size of the preschool has on the program. See Table 3.1 for more details about the participating preschools.

Table 3.1 Participant Sample Information

Case	Starting date	Age I visited	# class-rooms	Started program	Director background	Lead Teachers	Teach
A	Jan/2007	3-1/2 yrs	1	X	EC/EE	Director	X
B	1976	34 yrs	1	no	EE/elem educ	ECE	X
C	2007	3 yrs	2	X	EE	EC & EE	no
D	Jan/2006	4-1/2 yrs	1	X	EE/Montessori	Director	X
E	2006	4 yrs	2	no	ECE	EC & EE	X
F	2004	6 yrs	1	X	Assoc (admin)	Elem educ	no
G	1967	43 yrs	3	no	ECE	EC & EE	no
H	2000	10 yrs	2	X	Elem educ	Elem educ	X

The participant population was drawn from the nature center based preschools identified in a report from a survey conducted of nature center based preschools in the United States (Bailie et al., 2009). In this report, 19 nature center based preschools were identified. Information on each of the nature preschools was obtained through an on-line survey and telephone interview with the directors of 16 of the sites. Eight of these

directors were asked to participate in this study. They were chosen based on the factors listed above.

Although the aim was to explore nature center based preschool practices with this sample of nature preschool directors, in some cases, nature preschool teachers were also part of the interview or added relevant information (especially if the director was not a classroom teacher or was only the administrator of the program). In one case the nature center director (who was the impetus behind starting the preschool) took part in some of the interview with her preschool director. Gathering information from multiple people at some of the sites was especially advantageous and added to the richness of the data.

Following IRB approval, each of the participants was provided an informed consent letter that she signed prior to interviews being conducted. A copy of the informed consent letter is included in Appendix A. Confidentiality was maintained by changing the names of the participants and their nature preschool sites in the findings chapter of this dissertation.

Overview of Research Design

The following lists the steps taken to carry out this research. Following the list, several of the steps are considered in more detail.

1. Preceding this study, I worked on a survey to identify and benchmark the nature center based preschools in the United States. This served as the starting point for identifying the participants in this study. A selected review of the literature was conducted to get an understanding of the place that nature preschools hold in the early childhood and environmental education fields, to review high quality practices of both, to understand the nature/children connection (deficits and

benefits), and finally to underscore that there has been little or no research on nature preschools.

2. Following approval for this study by my dissertation committee, I applied for and received IRB approval to conduct this study. This involved outlining all of the processes and procedures necessary to perform this research as required for the study of human subjects including confidentiality and informed consent.
3. After a purposeful selection process of choosing the potential research participants (from the 2009 survey), I sent emails to each participant asking if he or she would be interested in participating in this research. I included a copy of the informed consent letter for him or her to sign and return to me if he or she decided to participate. After agreeing to participate, I scheduled interviews with each participant at his or her nature preschool site.
4. Semi-structured, in-depth interviews were conducted with eight nature preschool directors at their nature preschool sites throughout the United States. These interviews were recorded using a digital audio recorder. At half of the sites, only the preschool director was interviewed. At two of the sites, the preschool director and a teacher were interviewed together. At one of the sites, the nature center director and the preschool director were both interviewed, and at one of the sites the preschool director included several of her teachers as a follow up discussion to the initial interview.
5. On the day of each interview, I observed at least one nature preschool class at each site (at some sites more than one class) before or after the interview with the director. Photographs of the nature preschools, including indoor classrooms,

outdoor play areas, and activities, were taken to supplement the observations, document the program, and help me remember the details of the environments.

6. Documents were collected from some of the nature preschool websites, provided by the directors during the site visit, or emailed to me as a follow up after the visit. Documents included parent handbooks, marketing materials, curriculum materials, lesson plans, newsletters, and any other materials that the directors were willing to share about their program.
7. Following the visits, the interviews were transcribed and the data were analyzed within each case and a summary case report with initial findings was written for each site.
8. A cross case analysis of the data was conducted that resulted in merged findings and assertions that applied to each of the research questions.

Data Collection Methods

“Understanding the case in its totality, as well as the intensive, *holistic* description and analysis characteristic of a case study, mandates both breadth and depth of data collection” (Merriam, 1998, Chapter 7, para. 1). Qualitative case study research employs multiple methods of data collection and triangulation in order to get an in-depth understanding of the research problem (Creswell 2007, Yin 2009). This study employed a number of data collection methods including in-depth interviews, observations, and document review. “The backbone of qualitative research is extensive collection of data, typically from multiple sources of information” (Creswell, 2007, p. 43).

The main technique that was used to gather data was in-depth interviews. The most common type of data collection method for qualitative studies in education is interviews. Interviews are used when we are unable to observe feelings or the way people interpret their experiences. It is also used to discover elements of past experience (Merriam, 1998). The type of interviews used were semi-structured interviews that were conducted face-to-face at the site of each director's nature center based preschool. Semi-structured interviews combine structured questions with open-ended questions allowing the researcher to be informal and to follow-up by being responsive to the answers given by the interviewees (Merriam, 1998; Rubin & Rubin, 2005). Face-to-face interviewing provided the opportunity to visit each nature preschool and observe the program in action. Rubin and Rubin (2005) suggest that "responsive interviewing approaches a problem in its natural setting...choos[es] interviewees who are knowledgeable about the research problem, listen[s] carefully to what they tell you, and ask[s] additional questions about their answers until you really understand them" (Preface, para. 2,3). The interview questions were built around the study's research questions. Probes were used to elicit more details and follow up questions explored new ideas that emerged during the interviews (Rubin & Rubin, 2005; Stake, 1995). The initial set of questions were reviewed by my doctoral committee and revised based on their input. The first interview served to pilot the questions. No changes were made to interview questions, so this interview was included in the data analysis. A reminder email and an initial set of the main interview questions were emailed to each participant prior to the scheduled date of their interview. This was done to provide the participants time to think about their program and to put together possible documentation to better explain their preschool.

Because of the conversational and informal tone of the interviews, participants were able to answer the questions at their own pace and used the opportunity to show aspects of their environment or resources and materials to better explain the program. All interviews were audio recorded using a digital audio recorder and transcribed at a later date.

Participants were sent a copy of the transcripts for their feedback and comment. The final interview schedule is included in Appendix B. Merriam (1998) suggests that, “the interviewer-respondent interaction is a complex phenomenon. Both parties bring biases, predispositions, attitudes, and physical characteristics that color the interaction and the data elicited” (Chapter 4, “Interviewer/Respondent Interaction”, para. 7). Therefore, in addition to the interviews, I observed the classes and reviewed documents.

Elements of the programs, specifically preschool classes, were observed and photographs of the indoor and outdoor areas were taken in order to validate the directors’ comments and to provide more opportunities to revisit each site and ask follow-up questions (by telephone and email) of each director. Observation is another primary source of data for qualitative research and differs from interviews in that “observational data represent a firsthand encounter with the phenomenon of interest rather than a secondhand account of the world obtained in an interview” (Merriam, 1998, Chapter 5, para. 1). Fieldwork connotes informal conversations interwoven with observations, and this type of field study took place at each site. The primary purpose of these observations was to triangulate emerging findings. The preschool classes were observed at each site (both inside and outside). When possible, they were observed for a whole class time so I could see the interactions between the teachers and children and how they integrated early childhood and environmental education within the class. I also looked for examples

of excellent educational practices. The physical layout of each site was observed to document the elements of the classrooms and the outdoor areas. Nature preschools should include different areas of the classroom as found in high quality preschools such as an art area, block area, dramatic play area, etc., but with a nature focus. My knowledge and expertise in starting and operating a nature preschool provided a benefit in this regard, as I knew what to look for. “The participant observer sees things firsthand and uses his or her own knowledge and expertise in interpreting what is observed rather than relying upon once-removed accounts from interviews” (Merriam, 1998, Chapter 5, “Observation in Research” para. 4). Field notes of the observations, and my comments, were recorded in a journal and typed up after each visit and became part of the data that was analyzed. Inherent to observation is the fact that observers often affect those being observed. According to Merriam (1998) observers can take on various stances from being a full participant to being a spectator. In this study, using Gold’s 1958 typology, my role fell in the category of observer as participant (as cited in Merriam, 1998). Being aware of the possible influence I could have on the class being observed was noted whenever possible. Observation “when combined with interviewing and document analysis, allows for a holistic interpretation of the phenomenon being investigated” (Merriam, 1998, Chapter 5, “Summary”, para. 1). Therefore, using multiple methods of data collection served to minimize my influence on the data. What is observed is not controlled by the investigator (other than their perceptions), whereas the investigator can target and influence the focus of an interview (Stake, 1995).

Documents offer the researcher another avenue of investigation that is not subject to “the whims of human beings whose cooperation is essential for collecting good data

through interviews and observations” (Merriam, 1998, Chapter 6, para. 1). Merriam (1998) uses the term “document” to refer to “all forms of data not gathered through interviews and observations” (Chapter 6, “Nature of Documents”, para. 1). The participants were invited to provide documents that show tangible evidence of points they made about their program. These supplementary sources of data included newsletters, publicity materials, written curricula and lesson plans, orientation materials, parent handbooks, student work, and artifacts. Some of these documents were obtained from the nature preschool websites. Others were provided by the directors at the time of my visit or sent later as a follow up to my visit. Some of the preschool directors provided extensive documents, while others, very little (either because they did not exist or could not be found). Researcher generated documents included photographs that I took of each of the physical sites and activities. There are limitations to using documents as a data source because, other than the researcher generated documents, they were not developed for research purposes. They may be incomplete, unrepresentative, not in a form that is useful, may not fit within the conceptual model, and may not be authentic (Merriam, 1998). “Despite these limitations, documents are a good source of data...[because] many documents are easily accessible, free, and contain information that would take an investigator enormous time and effort to gather otherwise” (Merriam, 1998, Chapter 6, “Limitations & Strengths” para. 5) Documents are also stable and objective sources of data. For purposes of this study, the documents were used primarily to verify findings from what was observed and what directors said, as well as increasing the depth of the data collected and grounding the research in the real world. “Documents of all types can

help the researcher uncover meaning, develop understanding, and discover insights relevant to the research problem” (Merriam, 1998, Chapter 6, “Summary”, para. 1).

Data Analysis Procedures

The two levels of data analysis conducted were within case analysis and cross case analysis.

Within Case Analysis

The within-case analysis included several steps for each case. After the interviews were transcribed, I sent the transcriptions to the participants for their review and to check on accuracy. Several participants sent back comments and additional information. I then read through the transcripts of each of the interviews, for each case, and coded them by highlighting significant statements and writing emerging themes (categories) in the margins. Crabtree and Miller (1992) suggest several approaches to data analysis. Of these, the immersion approach, “the least structured and most interpretive, emphasizing researcher insight, intuition, and creativity” (as cited in Bloomberg & Volpe, 2008, p. 99) was employed in the search for emerging themes. I noted places that I needed more information or had questions. These questions were sent back to the participants for clarification. I used the same procedure of coding categories for the field notes from my observations and my reflections (that were written in a journal or dictated after visiting each site). Content analysis, “the *simultaneous* coding of raw data and the construction of categories that capture relevant characteristics of the document’s content” (Merriam, 1998, Chapter 8, “Content Analysis”, para. 1) was used for reviewing the collected documents. I listed the emerging themes and compiled categories using the constant

comparative method; constantly comparing each set of data in order to construct categories that captured some recurring pattern that cut across the data (Merriam, 1998; Stake 1995). Then I merged the categories into one list for each case. All the highlighted statements from the transcripts were placed under each of the interview questions in a new document. This organization helped me to make sense out of the data and to better understand each participant's answers to the interview questions.

I wrote up the findings into a case report organized by the categories that were compiled for each case with information from the transcripts, field notes, reflections, and document review. The researcher-generated documents (photographs) were used to describe the physical spaces (indoors and outdoors) in the case report. I reviewed each of the case reports and coded them with themes (from the research questions) in the margins. The number of times each theme was coded in the case report was tallied resulting in the prominence of particular themes in each case providing evidence for answering the research questions (for use with the cross case analysis). Each case report was reviewed again and specific findings were noted in my journal. Merriam (1998) suggests that, "the process [of data analysis] is highly intuitive; a researcher cannot always explain where an insight (that may later be a finding) came from or how relationships among data were detected" (Chapter 8, "Data Analysis Strategies", para. 1).

Cross Case Analysis

The cross case analysis followed the method outlined by Robert Stake (2006) in *Multiple Case Study Analysis*. Stake (2006) provides several worksheets that were very helpful for displaying and organizing the data.

To begin the process of reducing the data, I used the coded case reports, emerging categories, and interview question summary sheet to create summary reports for each case that included a synopsis of the case, situational constraints, uniqueness of the case, findings noted in my journal, relevance of the case for the research questions (including prominence of themes in the case and expected utility of the case for developing particular themes), possible excerpts for evidence of future assertions, categories that had emerged for each case, and my commentary on particular items pertinent to each case.

After completing the summary reports for each case, I again reviewed the expected utility of each case for developing each theme (research question). Taking one theme at a time, I considered the expected utility of each of the case reports for further development of the theme, rating the utility as high, middling, or low for each case for each theme. These were compiled on a worksheet for ease of review.

In order to rate the findings, I listed the findings for each case on a spreadsheet and then rated each one with high (H), middling (M), or low (L) as to its importance for understanding the research questions, taking one theme at a time. What resulted was a matrix with findings listed on the left column, grouped by case, and the theme numbers listed horizontally on the same row as each case title. The cells each received an H, M, or L corresponding to the finding and theme number it referred to. I then included the utility of each case from the previous worksheet by placing parentheses around each theme number for each case. I added another set of parentheses for high prominence of the case for each theme (taken from each summary report). I compared the ratings with the parenthetical headings. Although this information came from different sources and was

based on somewhat different criteria, it was a method to cross check some of my assumptions (Stake, 2006).

Tentative assertions were developed throughout the process of analyzing the data. These were listed numerically on a new spreadsheet. Assertions from the cross case analysis were developed by sorting the findings with high for each theme and choosing four to six findings that contributed the most to the understanding of each theme. The findings were labeled with checkmarks based on their H rating and parentheses around the theme number in the heading on the findings spreadsheet. The more checkmarks, the higher in the list the finding was placed. A tentative assertion was composed using the few findings that made the strongest, most relevant combination seeking others supporting that combination. “The Assertion should have a single or common focus, a contribution toward understanding the Quintain, and evidence from more than one Case to support it” (Stake, 2006, p. 56). To sum up, for this first round of writing assertions, I began with the case reports and identified the prominence of the themes (research questions). I then looked for utility of the cases to develop the themes. The next step was describing the relevance of the findings to each theme. I then gathered the high-importance findings for each theme. In short, I looked at what the case findings provided for each research question.

I had between six and eleven findings for each of the eight cases. This produced an unwieldy number of findings that was difficult to use and continue to write assertions. Therefore, I reduced the number of findings by using an alternative method proposed by Stake (2006). Stake suggests that not “getting bogged down in Case Findings...[when the researcher’s] highest priority is not preserving the situationality of the Findings...If it

seems desirable to reduce the number of Findings to work with...he or she may choose... [to substitute] Merged Findings for individual Case Findings” (Stake, 2006, p. 58). Using the individual findings produced some interesting initial assertions, but helped me realize it was not necessary to preserve the situationality of all the findings. The tentative assertions created so far were sufficient for this purpose. Therefore, I merged the case findings for this next round of assertion writing. The process I used to merge the findings was to group similar findings from different cases together into clusters. They were primarily grouped by topic even if the findings were contradictory. I gave each merged finding a name to identify the thrust of the cluster. Nine merged findings were identified and one special finding (an important finding, but with only one supporting case). The names of the merged findings clusters include ECEE integration, teaching staff experience and training, director’s role, the role of the nature center, nature preschool curriculum, intentional teaching approaches, outdoor time, influence of physical space, and parents. The special finding was “the program is based on research”. Each of the merged findings was expanded to include the information from each of the cases. These were then listed in the left column of a new spreadsheet. The second column included the cases where the findings were from. When more than one finding came from a particular case, the designation for that case was repeated the same number of times as the finding. The next step was to determine the presumed utility of the merged findings. Any case that contributed two or more findings to the merged findings and, according to the case summary report, that theme was rated as prominent in that case, the presumed utility of the merged finding was represented by parentheses around the entry in the applicable cell (the intersection of that finding and that theme) on the spreadsheet. Any case that was

noted as atypical in the case summary report was noted on the spreadsheet if a merged finding came primarily from that case. Any merged finding that did not appear to have sufficient evidence was also noted. The next step was to rate each of the merged findings for the importance they had for developing each of the themes (research questions). They were rated as high, middling, or low (with pluses and minuses when applicable). These ratings were placed in the matrix corresponding to the intersection of the merged finding and the theme number on the spreadsheet. Then I sorted the spreadsheet by each theme placing the merged findings with the highest ratings at the top and the lowest ratings at the bottom. Merged findings with ratings in parentheses were placed higher than the same ratings without parentheses. One or two tentative assertions were written for each theme and added to those written previously.

Several tentative assertions were developed through the processes listed above. Seven assertions were written during the analysis phase as I read through the case reports. Fourteen were written using the individual case findings (one to three for each theme) and nine were written using the merged findings (zero to two for each theme). I made notes relating to some of the assertions on the bottom of the spreadsheet.

The next step was the process of finalizing the assertions. I studied the list of tentative assertions and my commentary in order to reduce the number of final assertions by recognizing some of the overlap and redundancy and rearranging the order based on the most important assertions for understanding the research problem. I also reviewed the evidence for each assertion to be sure that there was enough evidence from the cases to keep the final assertions. These final assertions were used as the basis for reporting the findings and my interpretations.

The Role of the Interviewer/Researcher

The role of the interviewer/researcher is central to conducting qualitative case study research (Creswell, 2007; Merriam, 1998; Stake, 1995; Yin, 2009). This type of research is not looking for cause and effect relationships, instead it is getting at a deeper understanding of the research problem and requires interpretation. “Qualitative advocates...place high priority on direct interpretation of events” (Stake, 1995, p. 40). Interpretation is only possible when the researcher has expertise in the area of study. “The greatest allocation of expertise is needed...at the site for making interpretive observations...The primary characteristic of qualitative research is the centrality of interpretation...the findings are not so much ‘findings’ as ‘assertions’”(Stake, 1995, p. 42). Not only does the researcher need to have expertise in the area of study, but also he or she needs to be in the field gathering the data. “Standard qualitative designs call for the persons most responsible for interpretations to be in the field, making observations, exercising subjective judgment, analyzing and synthesizing, all the while realizing their own consciousness” (Stake, 1995, p.41). This type of research can be subjective so it is important for the researcher to recognize and identify their biases and be aware of this when collecting and analyzing data. “Both the readers of case studies and the authors themselves need to be aware of biases that can affect the final product” (Merriam, 1998, Chapter 2, “Strengths/Limitations of Case Studies”, para. 5).

I am well qualified to conduct this research as I have worked in the field of early childhood environmental education for 20 years. I started a nature center based preschool at the Schlitz Audubon Nature Center in 2003. This school is not part of the research sample, however, what I have learned from starting and operating this preschool does

enter into my interpretation of the research sample. I have been careful to be aware of my biases and have kept a journal with my thoughts so I could refer to them and be transparent in my interpretations. “The act of reflection, as Dewey (1916) suggests, affords the potential for reconstructing the meaning of experience that actually yields learning...In the qualitative dissertation, what you bring to the inquiry is as important as what you discover as you live with your project” (Bloomberg & Volpe, 2008, p. 4). Experience in the field of endeavor can also provide opportunities to deepen understanding of the subject and present the experiences in a knowledgeable way. “To sharpen the search for understanding, qualitative researchers perceive what is happening in key episodes or testimonies, represent happenings with their own direct interpretation and stories (i.e., narratives). Qualitative research uses these narratives to optimize the opportunity of the reader to gain an experiential understanding of the case” (Stake, 1995, p. 40).

Methods of Verification

Methods of verification in qualitative studies are often referred to as “issues of trustworthiness” (Bloomberg & Volpe, 2008; Yin, 2009). The purpose of these issues of trustworthiness is to address the more traditional quantitative issues of validity and reliability. Specifically, the degree to which something measures what it purports to measure and the consistency with which it measures it over time. However in qualitative research the focus is on providing evidence that what the researcher has described represents the reality of the case, that there is a clear accounting of the processes and procedures used to collect and interpret the data, and that potential biases have been

controlled throughout the design, implementation, and analysis of the study (Bloomberg & Volpe, 2008). Instead of using the quantitative terms of validity and reliability, qualitative researchers often use the terms credibility (validity), dependability (reliability), confirmability (objectivity), and transferability (generalizability) to describe these methods of verification (Yin, 2009).

The criterion of credibility (validity) makes sure that the researcher's portrayal of the participants' perceptions match. Credibility includes both construct or methodological validity (validity of measures) and internal or interpretive validity (validity of data analysis and interpretation) (Bloomberg & Volpe, 2008; Yin, 2009). Methods used in this study to verify credibility included: triangulation of sources, data collection methods, and data analysis; member checking of transcripts, final assertions, and identified quality practices; and peer debriefing and review of final assertions, identified quality practices, and drafts of several chapters. Triangulation of sources included interviewing nature center preschool directors (some of which were also teachers in the program and one of which was the administrative director and a parent of a child who had been in the preschool), nature preschool teachers (one of which developed the program and one that had had a child in the preschool program), a nature center director (who was also a grandmother of a child in the preschool), and informal conversations with several parents in some of the programs. Triangulation of data collection methods included interviews of the directors (and others listed above) at the nature preschool site, observations of classes in action and teacher/child interactions as well as the program environment (indoors and outdoors), and review of pertinent documents associated with the program such as preschool handbooks, newsletters, written curricula, lesson plans, registration

information, marketing brochures, natural artifacts used in the program, and researcher generated photographs of the indoor and outdoor environments. Triangulation of data analysis procedures included generating assertions using three different methods; initial researcher generated assertions, emphasizing case findings for assertions, and using merged findings for generating assertions. Member checking included sending each of the transcripts of the interviews to each of the participants for their feedback and revisions. Final assertions and a preliminary set of high quality practices were also sent to the participants. Peer debriefing and review included presenting the assertions and quality practices to a group of 50 nature preschool directors and teachers at the Nature Preschool Conference held in Midland, Michigan in May of 2012 with the opportunity for feedback. Several colleagues in the field of early childhood environmental education were given these assertions and identified quality practices, as well as, the opportunity to read the drafts of completed chapters of this dissertation for their feedback and comments.

The criteria of dependability (reliability) in qualitative research, is not assessed through statistical procedures, as is reliability in quantitative research. It primarily has to do with tracking the operations of the study, including data collection and analysis, so that the findings are consistent and dependable based on the data collected. Eliminating inconsistencies is more difficult in qualitative research so the goal is that the researcher should know when they occur. Therefore, it is “incumbent on the researcher to document the procedures and demonstrate that coding schemes and categories have been used consistently” (Bloomberg & Volpe, 2006, p. 86). To provide dependability I used an audit trail, a detailed and thorough explanation of how the data were collected and analyzed. Inter-rater reliability was achieved by asking a colleague to code several

interviews and compare them to my results. Using multiple cases also strengthens the study's reliability.

Transferability rather than generalizability is more important in a qualitative study when the sample is rather small and not random. Transferability refers to the reader being able to determine to what extent the findings might be applicable to settings that are similar, but not identical. Rich, thick description of the programs and settings was used to address transferability. "The end product of a case study is a rich, 'thick' description of the phenomenon under study. Thick description is a term from anthropology and means the complete, literal description of the incident or entity being investigated" (Merriam, 1998, Chapter 2, "Case Study Defined", para. 8). Detailed information about the backgrounds and context of each of the nature preschools also offers a shared experience for the reader. Purposeful selection of participants and maximum variation in sampling adds to the transferability of the findings.

The concept of confirmability in a qualitative study refers to the idea of objectivity in quantitative research. Specifically that the findings are a result of the research and not possible researcher bias. The section above on the role of the researcher addresses this concept.

Ethical Considerations

Ethical issues in regard to participants are an important issue in any study. It is the researcher's responsibility to protect the privacy and rights of any participants, especially since they are generally proceeding with the study on a voluntary basis. Generally safeguarding participants in this study primarily refers to how information was collected

and stored since there was no potential harm associated with this research.

Confidentiality was of primary importance especially when dealing with a school setting. First, the participants all were provided an informed consent letter that they signed before being interviewed. All agreed in advance to my visit that included the interview, observations of classes and the settings, and review of documents. All gave permission for me to take photographs of the environments. Second, when choices were made regarding the reporting and disseminating of data, participants' rights and interests were considered of primary importance. Names and other significant identifying factors of the nature centers were changed in order to keep the information confidential. Safe guarding measures were taken to secure the storage of the research related materials and only my dissertation advisor/committee and I had access to the data.

Summary

This chapter provided a detailed description of the study's methodology. Qualitative, multiple case study methodology was employed to illustrate how nature center based preschools integrate early childhood and environmental education goals in teaching young children. The participant sample was made up of eight nature center based preschool directors, purposefully selected to participate, using maximum variation sampling. Three data collection methods were employed including semi-structured interviews, observations of classes and settings, and document review. Two levels of analysis were conducted to examine the data including within case analysis and cross case analysis. Methods of verification were accounted for through various strategies including triangulation of sources, methods, and analysis.

CHAPTER 4 FINDINGS

Introduction

The purpose of this multiple case study was to explore, with a sample of nature center based preschool directors, how nature preschools integrate early childhood and environmental education goals in teaching young children. It is my hope that by describing practices in these little studied nature preschools, directors and teachers working in these programs or starting new programs will adopt the quality practices that emerge. This chapter presents the key findings obtained from eight in-depth interviews with directors and teachers, class observations, and document review at a selection of nature center based preschools in the United States. Thick description (Geertz, 1973) is used to share the details of the cases that support or explain the findings, including quotes from interviews and descriptions of the classes and settings that were observed. Between six and 11 individual findings were obtained for each case, for a total of 73 individual findings. These individual findings were used to write 14 assertions relating directly to the research questions. According to Stake (2006), assertions are the findings of a multiple case study where individual findings are combined to reflect the understanding of the quintain (or phenomenon under study). The individual findings were then grouped together in 10 clusters resulting in 10 merged findings that were used to write nine assertions relating directly to the research questions. Seven additional assertions were written from direct interpretation of the data (Stake, 1995). These 30 tentative assertions were reduced to 14 final assertions, divided by the research questions that they seek to answer. Findings are presented as follows:

1. Descriptions of each case setting are presented to give the reader a sense of the nature center based preschools involved in this study, what they have in common, and the breadth of their variation.
2. The categories that emerged from the data for each case are presented to show the commonalities between the cases as well as the particular resources available to each.
3. The merged findings are presented with a list of the individual findings that comprised them (see Appendix C).
4. And lastly, a discussion of the final assertions that answer each research question, with details and quotes that support and explain each one, is provided.

Descriptions of the Cases

The following vignettes serve to acquaint the reader with each of the cases. Although brief, I hope to convey, through rich description of each, the setting and particulars of each program.

Case A

Located in a county park system in a rural area of a central Midwestern state, this nature preschool, started in January of 2007, runs with a volunteer staff and minimal budget. One class (12 children or less) meets three days a week for three and a half hours per day. The classroom is housed in a metal maintenance building, enhanced on the outside by a beautiful garden, but transformed on the inside with natural materials, animal mounts, barn siding and murals. This one room preschool resembles a classic nature center of years past, where tree stumps serve as chairs and benches are made out

of logs. A table displays all the local animals that have been found and cared for by the children, including snakes, turtles, fish, crayfish, toads, spring peepers, salamanders and snails. The classroom contains handmade games and materials.

The windows look out onto the property (one of four county parks in the system) including 292 acres of prairie, wetlands, ponds, trails, farm, and gardens. There are several one-acre, and one thirty-two acre, ponds. A bridge covers the creek that runs through the property. There is a natural play area a distance from the preschool (that replaces a fenced in area) containing a huge dead tree that the children climb on and have named the pirate ship, large entangled grapevines used as a jungle gym, large bird nest created by the children, cow femurs that have been renamed the dinosaur bones, and a hugging tree (an oak with two large branches). A nearby hill serves as a sledding hill in the wintertime and a mud mountain in other seasons. The director has both an early childhood and environmental education background and teaches in the program.

Case B

Started in 1976, this preschool is one of the oldest nature preschools in the country. It is housed in one classroom connected to a wildlife sanctuary located in the northeastern United States. The nature center is nestled into the woods in a rural area of the community. It is well weathered, but warm and inviting. It was built at a time when nature centers were cozy wooden structures and the gateway to the outdoors, not the main attraction. The preschool room is actually a renovated garage with a cathedral ceiling and knotty pine paneling. The classroom has two distinct areas, one with a cement floor for messy activities and a carpeted area for the reading area, group time and dramatic play. The two areas are partially divided by large blue shelving that is open to both sides. On

top of the shelving is an incubator (with eggs waiting to hatch) and an aquarium where tadpoles are beginning to emerge into wood frogs. There is also a science table dividing the two areas, accessible from both sides, displaying bird field guides, a microscope, pond water and several children's books. Two guinea pigs reside next to the library.

Floor to ceiling windows provide an invitation to the outdoors that include 775 acres of woodlands, wetlands, and grassland just a mile from the local towns. Four miles of trails loop through the gently rolling floodplain forest habitat. Although there are no fenced in play areas, the outdoor time includes specific destinations that the children visit and have named the "building area" and the "village" where there are loose parts (sticks, logs, etc.) that the children use cooperatively to build structures providing opportunities for nature play. There is one class (18 children), three teachers (two environmental educators – one of whom is the director and one early childhood educator). Children come two, three, or five mornings per week.

Case C

Located at a nature center in the upper Midwest, this nature preschool is a collaborative program partnering with a local school district. A relatively new program, started in 2007, it began as one classroom using an existing building on the nature center grounds. In 2009, it expanded to two classrooms in a new "green" two-story preschool building that is cedar sided, with a set of windows that offer natural light to the hallway and classrooms that are on either side. A lovely wooded path leads parents from the parking lot through a natural play area to the nature preschool. Inside spaces are full of knotty pine paneling, rustic furniture and large windows. The classrooms are beautiful

state of the art spaces with wood furnishings (Community Playthings) and natural materials throughout, exuding a homey feel that is comfortable and pleasing.

Situated on 1148 acres of diverse habitats including woodlands, wetlands, rivers and upland fields; two fenced in natural outdoor play areas enclose the preschool in the front and the back. More than 15 miles of trails extend their way out of the play areas including a boardwalk and pond that lines one of the sides of the preschool building: a perfect place for children to catch frogs and feel comfortable in the natural surroundings.

The two classrooms house four classes with 16-18 children each and one lead teacher and two assistants per class. One class is all day, four days per week. The others meet two, three or four half days per week. The teaching teams have diverse backgrounds (in both early childhood and environmental education). The director, who does not teach in the preschool, is also the nature center education director.

Case D

Combining the Montessori method with a nature focus, this small nature preschool was started by the director in January of 2006. Located in the northeast in an Atlantic seacoast town, the nature center building and preschool are surrounded by 350 acres of woodlands, meadows, pond and wetlands, rocky ledges and a bog. The grounds also include eight miles of hiking trails, a butterfly house, wildflower garden, and large cages with resident raptors.

The preschool is located in a renovated 1960's house at the end of a winding path through the woods from the parking lot, a short distance from the nature center. The exterior of the house includes rough-cut paneling and stonewall terraces. It has a quaint feel and fits well in the wooded surroundings. The classroom is one class but contains

multiple rooms and is on two levels of the house. Knotty pine paneling provides a warmth and natural feel inside. The main floor is furnished with Community Playthings wooden furniture and there are Montessori materials throughout. Downstairs is the messy area including art, sensory table and dramatic play. Animals on both floors include turtles, guinea pigs, worm composting and a toad.

The children go outside through the lower level to a small fenced in play area that contains a wooden play structure, a raised garden (that the children planted), sand box, rabbit hutch, tree, and two picnic tables. Looking over the wooden picket fence down the slope is a natural play area bounded by natural features. A gate at the corner of the fenced in play area opens out to long terraced steps, defined with logs, that lead to the natural play space below. Lush with green trees and bushes, the play area invites the children to make discoveries and challenges them to climb and jump. In this wooded area are logs surrounding a fire pit, several large boulders, a wigwam frame, lots of loose parts of long branches and logs, hollow logs, a wildflower area and a handmade log gate.

There is one classroom with 16 children. Children attend two, three, or five days per week for four hours in the morning. The director has a background in environmental education and Montessori methods and also teaches.

Case E

Located in the northeast, this nature preschool is under the umbrella of a state environmental organization and is situated on 232 acres of forest, ponds, fields and a working organic farm (CSA) with farm animals. Essentially one classroom, the children split their time between the nature center/farm and a renovated house. The nature center is a red brick colored wood building that has a barn appearance and is the entranceway to

the farm. In the back of the nature center is a large multiuse room with knotty pine paneling, hardwood floors, a cathedral ceiling, and a stone fireplace. There are plenty of windows that provide natural lighting. This is the preschool room on Mondays and Tuesdays when the children hike down to the farm and do farm chores (feeding and grooming the farm animals). They also have access to a teaching garden space and greenhouse. The rest of the week they have their classes at a restored house that is a long walking distance from the farm. There they enjoy a homelike atmosphere as the rooms contain all the elements of a preschool classroom including dramatic play, science area, reading area, group time space, block space, etc., with natural materials infused throughout. The backyard of the house is a grassy area with a Weitu, pretend fire pit, climbing trees, logs, and a raised garden bed.

Children come two or three days per week for three hours per day. There are 14 children per class. The preschool was started in 2007, but 2009 was their first year using the house. The director (who also teaches) has a background in early childhood education. The teaching staff has diverse backgrounds (an early childhood educator and an environmental educator).

Case F

Located in the Midwest, this nature preschool is a parent cooperative that has a partnership with a national park located on one of the Great Lakes. The parent cooperative started in 2004, but the actual nature preschool program began in 2000 by the lead teacher through a local university field station. When the field station no longer supported the program, the parents stepped in and started the cooperative. The partnership arrangement with the national park provided two buildings, both in need of

renovation, at a historical homestead property in the park. The park gave the cooperative a free 60-year lease of these buildings (a barn and 1870's house) in turn for parents raising money and renovating the buildings. Situated on over 500 acres of forest, pond, prairie, wetland, river, lake, and beach, the two-story barn looks traditional on the outside with vertical red wooden planks, white window frames and doors, and the time honored, signatory barn roof. The inside looks bright and clean, with a lower level dedicated to art projects. An upper level houses the preschool activity areas and includes big barn windows and lots of natural light. Outside the barn is a natural play area with natural boundaries that include trees, soil digging area, and rock area.

Three-year-old children come two days and 4 year-old children, three days per week for three hours a day. The three-day program has 24 children with three teachers and two parent volunteers. The two-day program has 18 children with two teachers, an assistant, and two parent volunteers. A three afternoon kindergarten enrichment program is in the renovated house that was completed in 2009. The head teacher has a background in elementary education and developed the program. The director started the parent cooperative, which requires more from parents than a traditional preschool.

Case G

Started in 1967, this is the oldest nature preschool in the United States. The nature center was founded in 1960 on the property of a large estate located in the northeast, in the shadow of a big metropolitan area. Situated on 40 acres of meadows, woodlands, streams, ponds and marshes, the grounds offer unique resources such as an orchard, gardens, greenhouse, aviary, apiary, and sugar house that add numerous destination points and activities for the preschoolers. Naturalist buddies work with specific preschool

classes on a regular basis. The nature preschool is a well-established program and is located on a campus that runs between two buildings; the barn and the annex. There is no central entrance. Two older classrooms are housed in the renovated barn, one smaller room with a door to the outside that is often left open on nice days, and one larger room with a manmade tree house in the center. A newer classroom, furnished with Community Playthings wooden furniture, is housed in the renovated annex building. There is one fenced in play area outside the annex building with logs and gardens, and a courtyard area outside the barn with logs, a playhouse and tree.

Children (96 total) come two, three, four, or five days per week for three hours per day. One of the classes for 4 and 5 year olds has an extended day enrichment program two afternoons, adding four additional hours per week to the already five day class. Most of the classes are differentiated by age except for one mixed age class. The preschool classes are housed in separate buildings from the main nature center. The preschool director is an early childhood educator, but does not teach. Two of the teachers are environmental educators.

Case H

This nature preschool is located in a facility that is part of the parks and recreation department of a municipality in a midwestern state. The nature center is situated on a 668-acre wildlife sanctuary with over eight miles of hiking trails winding through prairies, woodlands, and wetlands. Outdoor animal exhibits include bison, elk, raptors, vultures and wild turkeys. Small animal exhibits are displayed in two interpretive buildings. The preschool is housed in one of the interpretive buildings, the prairie building, that has an experimental roof garden. It is a barn red color that fits nicely into

the prairie landscape. The exhibit space in the interpretive building includes a children's exploration area that is very inviting. Several animals, animal mounts, and interpretive signage provide information about the prairie outside. The two preschool classrooms are set up in a multipurpose room that was not specifically built for the preschool. Therefore, there is a sliding partition that divides the room into two classrooms, the windows and bulletin boards are located high on the walls, and there is limited room for dramatic play, block play, or art easels. There is a door that goes directly outside to a wooden deck that looks onto a pond and green grass on the other side where animals are grazing. A hiking trail is pretty close to the deck.

The preschool started in 2000 with one two-day a week class (10 students). It has grown to six classes (75 students). There are four mixed age classes of 3 to 5 year olds that meet two days per week and two Pre-K classes of 4 to 5 year olds that meet three days per week. The preschool director, who also teaches, has an elementary education background. A Nature Explore Classroom was just completed on site providing opportunities for nature play.

Emergent Categories

Interview transcripts, observations, researcher reflections, and documents were reviewed, and categories emerged from the data. All the cases included categories related to program goals/outcomes, curriculum/activities, program details, physical environments, parents/community, staffing, and nature center relationship. The following table provides a comparison of these categories among the different cases (see Table 4.1). Several categories were similar among the cases with variations within each category.

Table 4.1 Comparison of Emergent Categories

Case A	Case B	Case C	Case D
<p>Qualities of the director</p> <ul style="list-style-type: none"> Life-long learner, goal oriented Resourceful, tenacious, honest EC & EE background <p>Emergent curriculum</p> <ul style="list-style-type: none"> Integrated Child-directed Flexible <p>Program characteristics</p> <ul style="list-style-type: none"> Qualities - authentic, life-cycles, risk, problem solving outdoors Goals & Outcomes Preschool <p>Physical environments</p> <ul style="list-style-type: none"> Indoors – flexible, hand-made, local animals, natural materials Outdoors – habitats, natural playscape, gardens <p>Adult relationships & outreach</p> <ul style="list-style-type: none"> Parents – communication, family events Staffing – qualities & skills Training – professional development, workshops, community <p>Relationship with nature center</p> <ul style="list-style-type: none"> Feeder programs Volunteers 	<p>Preschool goals/outcomes</p> <ul style="list-style-type: none"> Social skills Grounded in local nature Enthusiasm, joy, fun <p>Preschool curriculum/activities</p> <ul style="list-style-type: none"> Child centered & focused Follow the seasons Authentic experiences Project approach Open ended art activities <p>Program logistics/schedule/history</p> <ul style="list-style-type: none"> Mixed age Project small group time Father attended in 1979 <p>Physical environments</p> <ul style="list-style-type: none"> Indoors – knotty pine, warm, well used, some local animals Outdoors – destinations with loose parts, no fenced in playscape <p>Community/families</p> <ul style="list-style-type: none"> Parents Impact on families <p>Staff – Director/Teachers</p> <ul style="list-style-type: none"> Staff collaboration Intentional teaching methods <p>Nature center</p> <ul style="list-style-type: none"> Nature playground project Relationship with nature center 	<p>Preschool goals/outcomes</p> <ul style="list-style-type: none"> ECE – prepare for kindergarten Connect kids to nature Intellectual capacities Combining EC & EE – more powerful than alone Higher purpose – share ideas <p>Preschool curriculum/activities</p> <ul style="list-style-type: none"> Creative Curriculum Enhanced to include nature Emergent – follows the seasons Project approach Integrated Puppets as teaching tool <p>Parents & Community</p> <ul style="list-style-type: none"> Communication & Education Kindergarten readiness <p>Staff</p> <ul style="list-style-type: none"> Director supports staff – life long learner Diverse teachers backgrounds Hiring the right staff – get it at their core <p>Physical Environment</p> <ul style="list-style-type: none"> Inside – warm, cozy, natural light Outside – natural play areas <p>Relationship w/nature center</p> <ul style="list-style-type: none"> One staff Positive and supportive 	<p>Preschool goals/outcomes</p> <ul style="list-style-type: none"> Half their time outside everyday Nature center mission Kindergarten readiness skills Independence Natural joyous childhood <p>Curriculum/activities/schedule</p> <ul style="list-style-type: none"> Director created Seasonal themes (from NC prog) Preschool standards Montessori influence Unstructured play outdoors – most important <p>Staff</p> <ul style="list-style-type: none"> Backgrounds mostly EE Director influences <p>Parents/Community</p> <ul style="list-style-type: none"> Communication of goals Good reputation (because of nature center) <p>Physical Environment</p> <ul style="list-style-type: none"> Inside – renovated house Outside – natural play area <p>Nature center</p> <ul style="list-style-type: none"> NC programs – precursor Relationship is good (not separate) – preschool is an education program of the NC

Case E	Case F	Case G	Case H
<p>Program goals/outcomes</p> <ul style="list-style-type: none"> • Multisensory experience • Nature as backdrop • Sense of place • State EE org. goal • Director personal mission • Exploration <p>Intentional Teaching Methods</p> <ul style="list-style-type: none"> • Creating community • Inquiry based teaching • Starting outside first • Behavior management plan <p>Curriculum/Activities</p> <ul style="list-style-type: none"> • Farm chores/wildlife visits • Living classroom/authentic • Seasonal activities <p>Staff</p> <ul style="list-style-type: none"> • Well educated • Love teaching outdoors • Director – growing up w/nature <p>Parents/community</p> <ul style="list-style-type: none"> • Parents get the program <p>Physical Environment</p> <ul style="list-style-type: none"> • Two sites – nature center/renovated house <p>Nature Center</p> <ul style="list-style-type: none"> • Good relationship • Well integrated 	<p>Program goals/outcomes</p> <ul style="list-style-type: none"> • For children to love to learn • Preparation for kindergarten • Taught through nature themes • Self regulation skills from nature • Critical thinking & asking ques. • Awareness empowers action <p>Curriculum/art projects</p> <ul style="list-style-type: none"> • Immerse kids in units of study • Project based • Skills adapted to diff units • Concentration on art projects <p>Competition/Cooperation/ Problem Solving</p> <ul style="list-style-type: none"> • More confident, less competitive • Intentional projects promote coop • Opportunities to figure things out <p>Staff</p> <ul style="list-style-type: none"> • Dir & head teacher make program • Life long learner • New teachers – hard to find <p>Parent Cooperative</p> <ul style="list-style-type: none"> • Advantages/Challenges • Parents volunteer • Special programs <p>Physical Environment</p> <ul style="list-style-type: none"> • Renovated barn • Renovated house <p>NPS/DLC</p> <ul style="list-style-type: none"> • Partnership • Not very supportive 	<p>Program goals/outcomes</p> <ul style="list-style-type: none"> • Appreciate, respect nature • Ready for kindergarten • Love and respect themselves • Memories of love of nature • Curiosity, lifelong learning • Unique resources, buddy naturalist <p>Curriculum/activities</p> <ul style="list-style-type: none"> • Nature based • Teachers decide how to implement • Academics integrated in context of reality • Would like more project approach • Would like more nature focus on hikes <p>Staff</p> <ul style="list-style-type: none"> • Director background • Teacher communication • Teacher motivation • EC most important <p>Parents/Community</p> <ul style="list-style-type: none"> • Parent communication • Preschool director's group <p>Physical Environment</p> <ul style="list-style-type: none"> • No central entrance • Two buildings <p>Relationship with Nature Center</p> <ul style="list-style-type: none"> • Good relationship • Some feel separate 	<p>Program goals/outcomes/schedule</p> <ul style="list-style-type: none"> • Nature/science based • Came from NC director • Preschool director added preK • Makes a profit • Grow up with environmental ethic • Kindergarten skills • Schedule – traditional class <p>Curriculum/child directed vs. teacher</p> <ul style="list-style-type: none"> • Study units – every 2 wks • Use collections • Recycled art • Academics • Outside child centered activities • Classroom is teacher directed <p>Staff</p> <ul style="list-style-type: none"> • Director background • Teacher communication • Teacher backgrounds • EE not as important <p>Parents/Alumni/Community</p> <ul style="list-style-type: none"> • Parent communication • 5 year reunion of alumni <p>Physical Environment</p> <ul style="list-style-type: none"> • Not built as a preschool <p>Relationship with Nature Center</p> <ul style="list-style-type: none"> • Good relationship • Unique resources only nature center can provide

Merged Findings

Ten merged findings were constructed from 73 individual findings from the different cases. It was important to keep the individual findings intact so as not to lose particular details of the cases and possible rival explanations. However, the merged findings give a representation of understanding the quintain (phenomenon under study or nature center based preschool programs). The titles of the merged groupings include early childhood environmental education (ECEE) integration, teaching staff experience and training, role of the director, role of the nature center, nature preschool curriculum, intentional teaching approaches, outdoor time, influence of physical space, and parents. One special finding (a finding from only one case) was included because of its relevance to high quality practices. The special finding is that the program is based on research. A list of the individual and merged findings can be found in Appendix C.

Research Questions and Assertions

The research findings, from individual cases and merged findings, were used to create assertions for each of the research questions. Several assertions were also developed through direct interpretation. These assertions were then reviewed, revised and combined for each of the research questions. They are listed below with evidence (quotes and descriptions) from each of the cases. Pseudonyms were used to protect the privacy of the participants.

Research Question One

In what ways do nature center based preschools integrate child development and environmental goals in teaching young children?

Finding 1. *The combination of early childhood and environmental education is more powerful together than each by itself providing opportunities for development of self-regulation skills (e.g., needing to be quiet outside in order to see wildlife, staying on the trails to preserve the plants, not picking flowers to save the food for the butterflies, giving children reasons for what they are asked to do), appropriate risk taking (e.g., opportunities to explore in natural play areas that contain trees and boulders to climb, logs to balance on, rocks to move, sticks to use), and cooperative play (e.g., using loose parts to build structures together outside). See Table 4.2 for examples.*

Table 4.2 Methods of Integrating ECE and EE

Cases	Self Regulation Skills	Appropriate Risk Taking	Cooperative Play
A	Setting natural boundaries that the children follow outside	Climbing the mud mountain. Climbing trees in nature play area.	Socialization skills outside in nature play area, cooperation, sharing
B	Child said that “we don’t pick flowers” to another child that picked one	Long hikes through the woods, high expectations for the children, children’s knowledge of safety rules	Working together for a common goal, cooperation in “the building area” outdoor wooded area using loose parts
C	Needing to be patient while fishing for catfish and minnows at wetland	Jumping in pond to catch frogs, natural play areas with logs and trees to climb	Working together to move totes of snow
D	Montessori materials and approach	Unstructured play in woods on their own, self-confidence	Natural play area supports this.
E	Being quiet to see the bird in the bird nest	Working with the farm animals is a challenging experience	Working together to feed the chickens.
F	Not picking flowers, being quiet to see animals, providing reasons, walking in a line on the trail	Walk on logs safely, confidence and independence	Building wigwam and homemade pond in backyard
G	Being quiet near the pond to see the frogs and ducks	Climbing on logs and rocks in natural area	Three boys working together to move a log in play area
H	Dramatic play outside – pretend bonfire using sticks	Climbing through the hollow log and climbing on another big log	Building with tree cookies outside

One of the preschool directors articulated the idea that the combination of early childhood and environmental education is more powerful together than each by itself. Although not said in quite the same way by the other nature preschool directors, the idea resonates with each program, “It’s bigger than a preschool program and it’s bigger than a nature center program. And then combining the two really is this really powerful thing” (Roberta).

Self-regulation skills. Using nature as an integrating context for early childhood goals was implied by all of the nature preschool directors. As an example, one of the nature preschool teachers talked about the social skills that the children learn outside on a hike and suggested that children practice self-control when they are being quiet outside in the natural world so that they can hear something or see something. That helps to develop self-regulation skills:

I think they know in their mind that if they could be quieter... They can’t pick flowers. I mean it’s hard not to pick and not to touch, you know how much kids love to collect things to be able to say, “Well we can take them and observe them but we have to put them back.” And to give them a reason for doing it... The social skills that and it’s really noticeable, with a small group like this, they help each other. And they really like doing that... It’s sort of this connectedness they get from being outside together all the time... Teaching them to hold a briar bush back for the next person... The cooperation that’s required from walking all in a line and being quiet and helping each other... Knowing that if you talk and yell and scream nobody’s going to hear anything or see anything. It’s not an

easy thing to learn... One of the three day teachers discovered a robin's nest that's right on the kids eye level... They had not been that close to a nest where they had to know not to touch the tree or touch the nest or touch anything. But a couple of them went in and reported on the eggs. Then when we went back with the ranger she was on the nest. They were so quiet, "you've got to see this" tiptoeing. (Brenda)

Appropriate risk taking. The unstructured play outdoors in the natural world was mentioned by most of the nature preschool directors as providing opportunities for children to develop independence and self-confidence, especially because they are able to take risks (such as climbing trees or balancing on logs). Diane described that the uniqueness of the program, as compared to traditional preschools, stems from, "that unstructured playtime... The kind of unstructured play to really be free and to get that sense of, um, self-confidence, 'cause they're off in the woods on their own... I don't think you can fully get that in some other preschools." Observations of the natural play area at this nature preschool included children climbing on boulders, moving rocks, climbing trees, and playing with sticks.

One of the nature preschool teachers said, "When we were in an environment where they could be outside all the time and hike all the time is that they develop this great independence and this self confidence... We try to give a chance to do things, walk on logs, do it safely enough that they can do it" (Brenda).

Cooperative play. All of the nature preschool directors felt that the children had opportunities for cooperative play, problem solving, and socialization skills when allowed to play in a natural area. Lois said, "I really feel that the benefits of the outdoors

allow...if the kids get wet, muddy, they get wet and muddy. But that's where they learn socialization skills, turn taking, cooperation, sharing, the unstructured play that so many kids are deprived." Roberta gave an example of how the children worked cooperatively, "They've made forts out of giant ice, well, they're snow balls, but they actually filled those totes with snow. And then they're so heavy that they need to all work together."

And I observed children working together using loose parts (branches and leaves) to build structures in an outdoor area the children named the "building area". Liz described it as, "cooperation, yep, they really do a good job of working together... The sites where they build have been really wonderful 'cause they group up in different ways and there is a lot of cooperation in a sense of working together for a common goal."

Finding 2. *The nature centers provide unique resources that enable the integration of early childhood and environmental goals by providing opportunities to develop empathy (e.g., taking care of animals), building confidence and dissolving fears (e.g., farm chores and exposure to animals and nature), fostering a sense of place (e.g., nature play in diverse habitats), and acting with an environmental ethic (e.g., awareness of nature empowers children). See Table 4.3 for examples. (See Appendix D for list of unique resources provided by each nature center.)*

Table 4.3 Nature Center Resources Enable Integration of ECE and EE

Cases	Empathy	Confidence	Sense of Place	Environmental Ethic
A	Taking care of local animals	Climbing on trees and logs in natural play area	Building & hanging bird feeders, exploring NC grounds	Finding the dead snapping turtles
B	Hatching chicks	Hiking in the NC diverse habitats on a birdathon searching for birds	Two areas for nature play called the “building area” and the “village” on NC grounds – children named them	Children tell each other not to pick the flowers – keen observation skills
C	Finding worm city	Children jumping in the pond to catch frogs – sense of confidence	Children have a sense of ownership and freedom to explore the NC habitats	Children get conservation message using rain barrels and making paper
D	Animals in the classroom – turtles, worm composting	Unstructured play in nature center habitats	Nature play in NC natural play area and building fairy houses	Recycling and composting
E	Farm chores	Farm chores & wildlife visits help dissolve fears over time	Nature center grounds and farm are a “living classroom” and foster sense of place	Children told me to be quiet when we explored the bird nest they had found
F	Keeping track of robin on its nest	Awareness of nature is empowering	Being outside in the natural world every day – exposure	Showing ranger the bird on a nest, being very quiet
G	Animals in the classroom – frog, fish, guinea pigs	Visiting the NC bees, jumping off logs in natural play area	Hiking to several destinations (NC diverse habitats) and providing time for nature play	Child said, “You can’t touch the frogs because they breathe through their skin.” Child said, “Don’t pick it” when seeing a buttercup flower.
H	Animals in the classroom - turtle	Getting over fear of snakes by meeting “Jake” the snake	Focus on respect for nature and sense of ownership of the NC grounds	Modeling by teachers – e.g., don’t step on ants or throw sticks in the ponds

Nature center resources. All of the nature centers provided unique resources that most of the nature preschools were able to use. All of the nature preschool directors described the resources their nature centers provide for the preschool, including such things as diverse habitats, maple sugaring, gardening, nature center and/or farm animals,

artifact collections, and special naturalist programs. These two directors provide a good example of resources available at most of the sites:

They get advantages in our preschool that other preschools don't...working in the greenhouse, the apple cider program in the fall. We tap the trees and we do the maple syrup in the early spring...buddying up with environmental educators. And their buddy, naturalist will come into their classroom and they'll bring our teaching animals... They will do that every week. Sometimes they just go on the walk with the kids. I think that's an advantage that no other preschool in this community can have.
(Pat)

We have a pretty substantial collection on everything and I think that's what a nature center can provide versus any other preschool or even a preschool says that it's nature themed. I don't think they have the collections that we do. They can get things out of books, they can get pine cones and acorns and stuff but we have a big display of bird nests and of bird feathers and wings and beaks and actual bones and stuff that is very educational. It's one of the best things we have. (Sally)

Empathy. All of the nature preschools have access to animals. Many are in their classrooms and the nature centers have animals that they can use or have a naturalist bring in. Some of the programs collect local animals with the children and have them in the classroom for a while before releasing them. Often the children get to feed the animals by collecting worms outside or using prepared foods. I observed one program where the children collected the local animals including snakes, turtles, salamanders,

crayfish and snails and placed them into aquariums and tanks. The children took the animals out and made homes for some out of cardboard boxes and blocks. Several of the children collected worms to feed the toads and turtles when we were on the hike.

Pat talked about the animals that the nature center naturalists bring into each preschool classroom, “We’ve got about 50 different teaching animals in our animal care facility and so they will bring in a hawk or an owl or a snake or a turtle or a chinchilla or a cockroach.”

Two of the preschool directors provided more concrete descriptions of how raising chicks and taking care of farm animals help to develop a sense of empathy in the children. Liz described the process of hatching chicks from eggs they got from a local university 4H extension, “When they’re cute and furry...we have kids sit in the book corner with a little paper towel on their lap and then just kind of hold them like this with the head up. We say, ‘make a little, you know, a cozy area with their hands and they just hold them so cute.” Lori described farm chores that their nature center farm allows all the nature preschool children to do on a regular basis:

There’s an eight-chore farm chore rotation that mostly involves feeding of all the farm animals. But it also involves pony grooming, cow milking, egg collecting. And over the course of the school year the children grow and change in their response to doing those chores... Farm chores are really tapping into the natural empathy that children this age feel for the world. It kind of lends itself to wanting to make friends, to be social, to get along.

Confidence. In many of the programs, exposing the children to animals helped to build their confidence and dissolve some fears. For example, Lori continued the discussion about the farm chores and how the children's fears of the animals were dissolved in the process of doing these chores all year. She also mentioned how exposure to wild animals during the wildlife visits from the naturalists has the same effect:

Sometimes in September or October when we first go into the sheep and goat barn, the baaing and maaing is so loud the children won't go in the barn. Sometimes the children will not milk the cow because the cow is so big, and when they get under there next to the cow it just is overwhelming for them. Or sometimes they won't do the pony grooming because the pony's head is going back and forth and it's unpredictable. Or they won't go in the chicken house because the roosters are all crowing at the same time. So there's some things that these children in this age group have to overcome in order to really feel involved in the farm chore. You're here on May 17 so the children have done these farm chores repeatedly. They know what to do with just a little bit of guidance and so not one of them refused to go in. So that's remarkable that they can grow in that way. Same thing with the wildlife visits. The first time that the corn snake appears, for example, or the snapping turtle, some children need to either hold a teacher's hand or stay in the back or do something else because they're afraid. And then it might be the second or third time that the children see these animals that they're really comfortable, and maybe even

respond to questions about them or maybe even use their finger to touch the scales of the corn snake. So that sort of growth is going on.

Brenda mentioned that as the year goes on, the children seem to be less competitive as they become more confident. She suggested that the exposure to nature empowers the children:

I think it does... So I think it's just that they realize over the course of time that they're going to all find things... And everybody will go and look at it. And I think it's another good confidence thing... And I think it's important to let them know the tiniest little thing we always stop...[For example, the] Junior Ranger program...instead of leading a hike, that they had to lead him on a hike... They picked what they wanted to show him and they showed him where the snakes lived. It was fun to hear them teach, "And they'd be down here on the rocks and they're out when it's sunny. And we have our own frogs." They showed him where the frogs were... They took him along the creek and told him different things that we'd seen.

Sense of place. Most of the nature preschool directors remarked that spending time outside every day really helps the children establish a sense of place. Brenda expressed the uniqueness of nature every day this way:

And the best thing about this is I find that you can take kids on all the field trips you want, but it's not the same as living with it and being out in it every day, so you can make observations about how things are different, or how they've changed, or what's new... The comfort level that kids get

with being in the woods and outside and just being in that surrounding...[people who don't have that experience] they're scared because they feel like they can't touch things and they don't want to walk... It's funny but I think that that's so important as they grow up to be responsible adults and to care, because if you're not comfortable and you don't have that connection...you're not going to pass that on to your children... We've had kids that have come in and they couldn't walk through the prairie 'cause they got touched by grass. And then by the end of the year, they're just. And you really don't have to make an effort... Exposure.

Diane spoke about how imaginative play outdoors fosters an understanding of a sense of place:

We do a lot of fairy house stuff here... It's building little tiny like mini-worlds and one of the people that I was kind of influenced by originally was David Sobel... And he talks a lot about how important creating mini-worlds are for children. For them understanding their sense of place, and how land is used, and it's basically just creating a little environment. They're not supposed to use anything that's not natural, only natural materials and nothing that's growing or living, and then fairies can come and visit... In the books [*Fairy Houses*, *Fairy Boats*, and *Fairy Wing*] the fairies end up being like a frog and a cricket and a butterfly.

Environmental ethic. Although not explicitly mentioned by all of the preschool directors, most of the programs exhibited ways that the children showed a caring attitude

towards the natural world. During my visits to the different programs, I observed several instances of children acting with an environmental ethic. In one program, a child showed me ferns and a small green spider and spider web, purple flowers (her favorite) and told me where the poison ivy was. She had keen observation skills. The group was very quiet listening for birds. “We don’t want to pick flowers,” said a girl after a child picked a flower for me. There was a sense of awareness about taking care of the environment. During a hike to a pond with another program’s class, we found frogs. One child told me, “You can’t touch the frogs because they breathe through their skin” and another child said, “Don’t pick it” in response to seeing a buttercup flower. While I was outside with a third program’s class, the children were catching frogs and jumping in the pond. Although the teacher was out there with them, they knew where to walk to not trample the plants, and they knew where it was shallow, and when they got to the edge they stopped. They were excited to explore and catch frogs and they had an awareness of the environment around them. And finally, with a fourth program’s class, a child told me to be quiet when we explored a bird nest they had found, because she didn’t want to disturb the robin sitting on the nest.

Research Question Two

What do high quality practices in nature center based preschools look like and are they consistent across programs?

The findings for what high quality practices look like at nature center based preschools are divided into two categories; developmentally appropriate practices (Finding 3) and environmental learning and literacy (Finding 4). Additionally, director’s provided their ideas on staffing excellence (Finding 5).

Finding 3. *The natural world provides opportunities for the curriculum to follow standards of high quality early childhood education, because by following the seasons, the curriculum can be emergent, child directed, academically integrated, and based on authentic experiences. See Table 4.4 for examples.*

Table 4.4 Developmentally Appropriate Practices

Cases	Emergent Curriculum	Child Directed Activities	Authentic Experiences	Academically Integrated Program
A	Focus on amphibians after hearing frogs outside	Girly Birdy unit – studying birds came from the children	Brought frog eggs back from a hike and tried to hatch them	Letter of the week connected to nature and what can be found outside Math – measuring fish
B	Flexible, teachable moments, loose curriculum based on natural world	Making ant traps	Ponding, painting wildflowers, collecting seeds, maple sugaring, studying trees, catching insects, raising wood frogs from tadpoles	Don't focus on academics, but incorporate it into nature focus – whole program is science
C	Catching frogs in the pond	Making puppets	Cutting skills – cutting leaves	Nature focus first, academics that are meaningful to children
D	Mostly found during outside time.	Outside in nature play area and Montessori approach	Child brought in chrysalis that emerged into a swallowtail butterfly	Connect numbers/letters to nature study such as 's' during snake study and #8 when learning about spiders
E	Teachers are open to child questions	Child discoveries, finding a toad	Physical fitness – hiking, farm chores	Result of learning about animals, i.e. graphing egg collection
F	Figuring out how to fix drain problem	Finding animals outside, building pond	Planting parsley to attract swallowtail butterflies	Kindergarten skills incorporated in themes (not always local)
G	Mostly found during outside time	Looking for bugs in outdoor play area	Hiking to the pond, visiting the bees	Learning academics “in the context of reality”
H	Mostly outside, e.g., building bird nests	Acorn play	Bones in plaster for fossils, mud pies with animal tracks, scat unit	Letters incorporated with nature themes, counting shells, lining up natural objects by size

Emergent curriculum. The natural world is always changing, and if the curriculum is based on what is happening outside, it needs to be flexible and emergent. All of the nature preschool programs described their curriculum as emergent when outdoors. Several were able to be flexible and allow the curriculum to emerge as they explored the natural world. Two examples of this approach follow:

If we see something when we're out, we sort of talk about that too. Like, you know, if we see a snake we can study snakes for a little while or just try to take a teachable moment. So I have to say that our curriculum is pretty loose... We do planning and we plan ahead, but we're also pretty low key about it... Yeah, about what we see and what's going on. (Liz)

The way we got started about the wetlands and salamanders and the frogs was, as we were walking around to the back of the dinosaur bones, the frogs were all calling. And you had your western chorus frogs and you had your spring peepers and you had your wood frogs calling and your northern leopards snoring. I'd say, "What is that?" and they're like, "I don't, is it a bird?" "I don't see any birds." And so we started talking about frogs, and we started getting frog things out, and we kind of filtered into a reptile and amphibian mode, especially when we found the snapping turtles, which they had appeared to be fighting. (Lois)

During an observation at one of the nature preschools, the children were catching toads in the back play area. Next to the preschool is a pond and the children decided they should search for frogs in the pond. One of the nature preschool teachers described the experience this way:

And for me, like this morning, I had not planned on going over to the pond and getting wet... But, you know what, when the kids wanted to, you know, they were finding toads in the back area. Then they wanted to go and find frogs. You know, you just have to, as a teacher, like wait, why not? Like, let's do it... Why can't they just jump over the edge? They've got their boots on. They know where they can walk. We've been working on this for weeks. (Ellen)

Child-directed activities. Most of the nature preschools had a child-centered approach to the curriculum when related to subjects pertaining to nature. This child-directed approach was prevalent when using natural materials. Sally described a child-directed activity that resulted from a donation of acorns:

Somebody donate[d] five gallon bucket of acorns... She went into the auditorium; a room of 40x30 and the kids each got a pile of acorns. And they used them as marbles, they built things with them, spent an hour just playing with acorns. Yeah, there was no set curriculum. It was just how they could play with acorns. It was wonderful... We stood back on the counter for an hour and a half. We didn't say a thing to them. We just stood there and watched... One little group lined them up from one wall all to the end. Some did their initials.

And Lois described a unit they had been working on called "Girdy Birdy" where the children started the process of studying birds that led to creating their own bird:

So we kind of follow their leads... When we did the unit on birds, somebody was feeding the birds at their house. And somebody brought in

a dead bird because “Lois will know” what it was. It hit their window...

That’s where the girly birdy followed from that. And the paper mache eggs... Like I said we’re very child directed.

Authentic experiences. Spending time in the natural world on a daily basis provided authentic experiences for the children in all of the nature preschool programs. Lori gave an example of what real work and hiking provide, “Physical fitness component... The stamina of the child... They’re expected to walk long distances, sometimes involving running, sometimes climbing. And then once they’re at the farm chore...they also have to have the capacity to attend to whatever lesson or experience is going on, so they’re not so tired.” Roberta explained how they use real objects for developing skills:

Fine motor we specifically want to work on, cutting skills. We never do the dittos; instead we’ll go outside and cut leaves along their veins. Anything we do inside, we try to think how can we take this outside or how can we bring natural materials inside and then take it up to the next level to make it more real for them.”

Liz talked about how they use the natural world with small groups. This mirrored many of the types of authentic activities that occurred at the other nature preschools:

Sometimes we do ponding, and again that’s a little bit hard with a big group like this... We sort of started taking small groups out during project time which is just sort of easier to focus on... We painted the wildflowers, so they each had a little easel that they brought out and they sat and painted the wildflowers out around the corner... I guess we’ve drawn

trees, too... Bark rubbings...and we tried to study this maple tree, watch it through the seasons. So we'd go out periodically and sketch it and take pictures of it... Then we tapped a maple tree, or we'll pick grapes, or we'll find acorns, or we'll pick up cones... Leaves, for leaf rubbings... Roll logs and see what's underneath, with little magnifying glasses and bug boxes. Sometimes when the field grows up we'll bring sweep nets out and just sweep and see what we find, crickets and little buggies... They've made their own little mammals [where] ...you can see the hitchhiking seeds. So we talk about how seeds move and how they carry... When the wildflowers are blooming we go specifically on a wildflower walk... We have butterfly nets for going out and getting insects and butterflies.

Academically integrated program. All of the nature preschool directors found ways to provide academics through the nature focus of the program. Most of the programs were not focused on academics and said that the experiential nature of their programs allowed the academics to be learned through meaningful experiences in the natural world. Pat expressed the idea of learning in the context of reality, "We do not do a letter of the week. We do not do a number of the week. We do not do a color of the week... There are so many more ways to integrate that into curriculum, in the context of reality." Another director, and one of her teachers, continued this idea of starting with what can be found in the natural world first, and then incorporating academics within it:

I think our planning for me starts with what's going on in nature, and then we take the skills that we want to be working on with the kids and incorporate it into what's happening seasonally, weather wise... We don't

pick a letter of the week or number of the week. We really want math and literacy and science, all of those skills to be part of their daily life. It needs to be relevant to them... It needs to be letters that are in their name...and curiosity as to “what does that sign say?” So it needs to be part of their life... And the same with math... Maple syrup is a good example... It matters to us how many gallons we’ve collected... They have a board with 40 different spots for 40 different buckets and then one gallon of syrup, so they can look at 40 gallons and one gallon. So they’re counting up their buckets, but it’s related to maple syrup because that’s what’s happening outside... We try labeling things, like with our tadpole aquarium...duckweed, tadpoles, frogs. (Roberta)

This morning we had somebody say, “Oh we’ve got three worms” and somebody else said, “Oh I have two.” Then somebody said, “Oh we have five.” Well there you go, math... And I didn’t do any of that. That was all them, just from what they found. They found worm city and it was. That was a conversation between two kids this morning. (Sam)

Liz explained how science *is* their program, and the way academics incorporates into the nature focus just happens naturally:

We don’t focus on academics. We really focus on the social piece... We do science every day, obviously, but we don’t like talk about it like, “Oh, now we’re doing science.”... We have like a bird of the day when we’re doing birds... We do observe life cycles directly, with the caterpillars and the tadpoles and all the pond critters that we bring in, so there is direct

observation of lifecycles, metamorphosis. But not strictly, not focused on academics. But I think it just happens... We're always counting... We have like books that we change every week that has, if we're doing insects it might have numbers or letters of insects... We never sit down and have like a letter of the day... We always have writing utensils. There's stamps with letters... It's more child focused where they come over and they might want to make their own, um, book. We have little books you can make. They make some with little stamps of insects.

Lori mentioned that the farm program provides opportunities for the children to ask questions and be curious about the animals:

It stimulates their curiosity. It gets them asking questions. I think it also builds a vocabulary. They learn about the features and behavior of a wide array of animals. It teaches them about the lifecycle. It teaches them about the seasons... [There is] a strong literacy component because we're always reading books related to what we're doing... The math aspect is there, in a very general way... concepts like height, size, weight, graphing.

Although most of the nature preschools were not focused on providing academics in an abstract way, some did have a letter of the week, but found ways to make it relevant to what could be found in the natural world. Lois explained how this worked in her program and also how she integrated math with fishing:

We do a letter of the week... I take index cards and I put a letter on it... I would stick these out on the trail... I will tell them before we go out, we'll talk about the letter...and then when they find it they flip it over or it

might be in the garden... So it has something to do with that letter and on the back is a picture of what it is... Like last week's was the letter V... Vulture, violet, vines.... We take them fishing...well bullheads and bluegills, but we will measure them and talk about how big this one is and then often times we graph it and we'll count the numbers. So did we get more bluegills, did we get more bullheads?

Two of the other programs approached academics more traditionally, with a letter of the week, but used nature topics to support them. One described it this way:

There is coordinated letters with the themes. So when we're doing snakes we do the letter "s"... So that is added into the curriculum. And there's one a week for each letter... So there's letters, I do numbers, and then we'll do like a couple of concepts, which are there all year round but we really focus on like colors, shapes, and things like that... We do include numbers and math in our curriculum. We introduce individual numbers as a concept tied into a theme. For example, we introduce the number eight when we learn about spiders. (Diane)

Finding 4. *The nature centers' diverse habitats provide opportunities for high quality environmental learning and literacy that concentrate on environmental concepts, encourage problem solving, and allow for child initiated nature play and exploration.*

See Table 4.5 for more details.

Table 4.5 Environmental Learning and Literacy

Cases	Environmental Concepts	Problem Solving Behavior	Nature Play and Exploration
A	Revisit places over again in different seasons	Give children time to figure things out – figuring out how to climb mud mountain	Natural playscape, children made bird nest
B	Follow the seasons, lifecycles of insects, mammals, conifers, birds, wildflowers, ponding, predator prey	Catching ants, child brought in newly emerged moth and children were looking in field guides to identify	The “building area” – a wooded area where the children can build and enjoy nature play
C	Based on the seasons – “what’s happening outside now”	Building a fort with loose parts	Two natural play areas on either side of the preschool
D	Artifacts, caterpillar turning into swallowtail, ponding, hibernation, composting	Setting up experiments	Natural play area near building with large boulders to climb and natural borders
E	Pollination, lifecycles, gardening	Inquiry based science – discussion about pollination and why bees are needed	Looking at holes in the ground – who lives there
F	Following animal tracks and figuring out whose they are	Fixing drainage problem, catching frogs, and bark boats	Building pond in the backyard of renovated house
G	Visiting the apiary and seeing and learning about the bees	Trying to figure out how to push a log that was too heavy	Children climbing in courtyard area with logs, rocks, & gardens
H	Units are nature/science based – e.g., prairie, reptiles, snow, turkeys, etc.	Figuring out how to go through the hollow log	Stopping at natural places “hidey holes” when on a hike like Nature Explore outdoor classroom

Environmental concepts. All of the nature preschool directors described how the diverse habitats at the nature centers allow the curriculum to follow the seasons and enable them to explore environmental concepts throughout the year. Two examples follow:

We do follow the seasons, so we start off usually at the beginning of the year with moths and butterflies... I raise a lot of monarchs... And then we

kind of move on to the differences between moths and butterflies, chrysalis versus cocoon... In the wintertime we study the coniferous trees... So we talk about the cones and how they're different and we study mammals a lot in the wintertime with the tracking and animal's signs... Then we do feeder birds... I think every year we kind of pick a different mammal to showcase. So one year we did like the different squirrels that live here, red squirrel, flying squirrel, gray squirrel. And then another year...we talked a lot about moles and voles and shrews... And beavers one year... Spring comes and we're...running out to see the skunk cabbage and what's coming up first and...the spring ephemerals that come out...spring wildflowers...insects...ponding, amphibians...stuff with the tadpoles and frogs. (Liz)

A lot of times we'll have different artifact materials... People will bring in nests and logs and one time we had a child bring in a caterpillar and it went right into a chrysalis like the first day... It was a swallowtail... The child came up to me and said, "My butterfly hatched."... If we're talking about mice we might play coyote, coyote what time is it. We might have pond dipping set up or bug hunting in the meadow. When we talk about spiders we bring out a stocking with flour and then they can shake it over spider webs and it comes...so they can see the spider webs... We have little collecting baskets for collecting rocks and acorns... One time when we were talking about hibernation... Three girls [were talking]...and then I heard them and they were like, "It's getting to be winter. We have to eat

lots of food so we can get fat and hibernate.” They made the connection themselves and they are now acting out what we have talked about.

(Diane)

While I was on a hike with one of the preschools, there were a lot of mosquitoes swarming around us. One of the children illustrated his knowledge of the environmental concept, predator/prey, and said, “There will be a lot of bug eating birds at the building site because there are a log of bugs.”

Problem solving behavior. All of the nature preschool directors spoke about ways that the natural world is used to encourage problem solving, as they explore different scientific concepts. Teachers give children time to figure things out. I observed a problem solving exercise between the children in one of the classrooms. Children were working at a table making plans so they “can catch animals.” They had caught an ant and wanted to catch more and put them outside. They had a discussion about how they could catch more ants. They said that the one ant would attract more ants. One child said they could use a map. “We have to put bug boxes at the end of each tape and we can trap them,” said one of the girls. The children began drawing maps and putting tape on the ground. And one of the children decided that tape needed to be bright colors to attract the ants. Two more examples of problem solving follow:

There were just all kinds of frogs sitting there. You know how can you get the frogs?... Problem solving skill... If your shadow is on the frog it’ll hop away because it’ll think you’re a blue heron. Just seeing them trying to figure out how... That you couldn’t stand on this side of the pond in the afternoon [where the sun is coming from]... “Uh oh Gus’ shadow scared

the frog.”... It’s much easier to tell them things than it is to ask. So I’m constantly saying [to myself], “Ok stop talking and ask them a question.”

(Brenda)

Cognitively we’re seeing more and more of that problem solving and that happens in a loose part environment versus structured play area... Fort building is a prime example. If they want to build this fort, but then they pick up sticks that are too short or too long or are not heavy enough to hold the next ones they put on it and to be able to talk through that. On a traditional playground they wouldn’t have that kind of problem to analyze and that’s a math skill... We are developing those skills, just not in the same way, as you would see it in another preschool. (Roberta)

Nature play and exploration. All of the nature preschool directors described the opportunities that their preschool children have to explore the nature center habitats and to engage in nature play. Lori described what the children do as they explore the nature center grounds:

When they’re outside one of the things that they look for a lot are holes in the ground and they wonder who lives there. They’re very tuned into any insects or any wildlife that they see, such as the turkeys and the frog this morning. They might talk about the weather. “The birds aren’t flying today because the clouds are covering the sun.” So they’re very aware of what’s going on around them.

Two of the directors described the natural play areas available for nature play; one that was a distance from the preschool on the nature center grounds, and the other right outside the preschool building:

By the dinosaur bones [cow femurs] is a huge dead tree, which the kids call their pirate ship and they can crawl in it and on it. There's a big tree that angles up...that's forked in another tree... And then there is a downed tree that we use as our balance beam. There are grape vines...that's an entangled mess that they use for their jungle gym...and they love climbing in it, on it, through it... All the kids gathered sticks and we made a bird nest... So it stands...high and they can crawl in it... And they can play and do whatever they want back there...and it's just a natural playscape area. (Lois)

We have two different play areas... The front is...more structured...[with a] trike track...[and] logs to climb through and the garden... There's a raised bed there...[and] the music area, the xylophone and the talk tube and then the art easel out front that they can paint on and...the stage...and little meeting area around that. And that gets all sorts of performances and things on it. And then the sand box in both play areas. The fort frame out back has been a big hit to just have the four posts with the top and then they can build on it. The wigwam frame and the meeting areas, stumps... Every year you just add something different. The rain barrels were really a big hit. I just thought, oh, we're going to collect rain and be smart about our rain use, but those have been fantastic because the kids can turn it on

and off, you know, there's a nozzle there. But then they also learn that if they leave it running that the water will be gone, and that the water's only there when it rains. And the conservation message is so relevant in a way, that turning water off in the sink doesn't make any sense to a four year old, you know... Kid size picnic tables at both play areas...[and] a rowboat out front. (Roberta)

Finding 5. *The natural world is the focus of the curriculum at a nature preschool, however, providing an excellent program requires teachers that have a working knowledge quality practices in early childhood education and environmental education, and know how to put them together to meet the needs of their students.* See Table 4.6 for a wish list of qualities, dispositions, skills, and knowledge of excellent teachers.

Table 4.6 Director's Wish List of Teacher Dispositions and Skills

Case	Qualities and Dispositions	Skills and Knowledge	Comments
A	Well rounded, love of children & nature, patient, tolerant, easy going, laid back	EC and nature, wildlife background	Personality of teacher is more important than education degree
B	Curious, calm, patient, kind, loving, understanding	Background knowledge of nature, but can look things up	Would like more info on special educ and sensory integration
C	Creativity, zest & joy for life, willingness to learn, playful, good energy level, excited to try new things	EC background, natural history, outdoor background	Hiring the right teachers who "understand it at their core"
D	Can handle risk factor, patient, consistent, happy	Handle EC, environmental can be taught	Teachers start out at the nature center first – proving ground
E	Curious, life long learners, comfort level being outside, respectful of nature	Working with young children	Nature gives curriculum, being tuned in to kids most important
F	Curious, creative, fun, outgoing, enthusiastic	Teaching experience, nature background can be learned	Young teachers haven't had experience outside themselves
G	Love & respect nature & children	EC most important, can learn the nature part Ideally ECEE	Need to be trained to handle animals
H	Discipline, dependability, warmth & caring	EC degree, nature & science knowledge up to 4 th grade level	Have training on handling animals

All the nature preschool directors described the qualities and skills they would like to see in nature preschool teachers. However, Roberta was the only one who put an emphasis on hiring the right staff as a prerequisite for an excellent program; specifically, hiring those teachers that understand the need to integrate early childhood education and environmental education and do this in ways that incorporate quality practices of both. The main point she made is, “I really think it comes back to hiring the right staff...I just think it’s proper selection to get the people who understand it, sort of at their core.” And Lori said, “I think the nature aspect gives you the curriculum, but being tuned into the kids seems to be the biggest part.”

Two of the directors emphasized the need for staff to be trained to handle animals, especially if the teachers are not environmental educators. Pat explained it this way, “We do have an animal care director and anybody can go in with an animal but she has to make sure we know what to do with it... The environmental educators are [trained], that’s not a problem. But our teachers can do it if they’ve been approved by her.”

And Diane’s program uses the nature center as a proving ground before hiring them as preschool teachers, “Most of us have taught over at the nature center first...and have taught hiking classes or some of those little preschool classes to kind of see how we do, see if we like it, and then if it’s the right kind of person, sometimes they get moved over here... It’s kind of like the proving ground usually.”

Qualities, dispositions, skills and knowledge. Each of the directors provided their list of qualities, dispositions, skills and knowledge that an excellent nature preschool teacher would need to have. Seven out of eight directors agreed that having a background in both early childhood and environmental education would be ideal; however, finding

teachers with both backgrounds is difficult. Five of those directors felt that having an early childhood background was more important than an environmental background, suggesting that the natural history part can be learned. Many of the directors looked for teachers that were curious, creative, life-long learners that love and respect nature and children. Brenda suggested, “Somebody who’s curious... I mean a lot of people panic and think, ‘I don’t know that much about nature.’ Well you only have to impress a four year old... Curious and creative; I think creativity is one of the big things and fun and outgoing.” Several other examples follow:

Calm, patient, kind, loving, warm...understanding...[and] to have the idea that kids are always trying to do their best... For the nature-based part, I think it’s helpful to have a background and know stuff, but I don’t think that it’s critical. Just getting out there and seeing what you see and maybe knowing how to find the answers. A good library of field guides and a little curiosity... It is great just to teach them [the children] how to look up in books. (Liz)

Early childhood background and experience working with kids, natural history, those two big categories...and some sort of outdoor background, skills, interest, at the very least an interest... Are they excited to play and engaged in play, creativity? A certain energy level...with that zest and joy for life and just wanting to be happy... Then you have people that are willing to learn, that are excited to try new things, to grow with the program. (Roberta)

We want someone who can handle early childhood... You have to have patience and be consistent... The second side is the environmental. We have had teachers here, super great early childhood teachers. Outdoor type people, but could not handle the risk factor with the children. You can't take them outside and not expect them to get hurt... I think the environmental, the nature, naturalist type of stuff can be taught. The other stuff is harder to teach...and it's hard to find people with both... I think there is a level of maturity though that has to be there. (Diane)

My first thing on the level of importance is that they have a knowledge of early childhood education. In your perfect world we'd have somebody that would be majored in early childhood environmental education. I think in a nature-based preschool the teachers need that early childhood knowledge... They can then learn the environmental education part of it... The teachers know that it's nature-based curriculum and they've got good resources... If they don't have the knowledge of what's developmentally appropriate for a 3 year old or a 4 year old, that's a little bit more of an issue. (Pat)

And Lori said, "Feel comfortable and respectful of nature...I think they have to be able to be life-long learners, very curious... Being able to let the children ask questions and then ask questions ourselves."

Finding 6. *Unique resources, provided by the nature center, are available at all of the nature preschools; however, how they are integrated into each program varies*

widely. Practices are not consistent throughout. Some lack practices associated with quality early childhood programs. See Table 4.7 for examples.

Table 4.7 Quality Practices Across Programs

Case	ECE Quality Practices	EE Quality Practices	Nature Center Resource Use
A	Mostly DAP – letter of the week	X	Teacher is a naturalist
B	DAP	X	3 rd teacher is a naturalist
C	DAP	X	Some teachers are naturalists
D	Worksheets, cognitively focused group time, letter & number of the week, teachers not sitting with children for snack – not family style	Cognitively focused hike	Regularly scheduled naturalists
E	DAP	X	Regularly scheduled naturalists, regularly use farm
F	Art projects – product driven Themes often not local	Cognitively focused hike	No regularly scheduled naturalists
G	Mostly DAP – Some art projects are product driven	Limited outdoor time and approach with some of the classes	Regularly scheduled naturalists
H	Worksheets, putting heads down, pledge of allegiance, letter of the week	Only five minutes outside	No regularly scheduled naturalists and no naturalists as teachers

Although all the nature preschools use the natural world as their focus, half of the programs consistently used quality practices of early childhood and environmental education. The other four had varying degrees of consistency. The inconsistencies inside the classes, included using worksheets, product focused projects, no free choice time or dramatic play, focusing on rote academics rather than inquiry, and a fact driven group time. There seemed to be little understanding of developmentally appropriate practices among these teachers.

Examples of inconsistencies outside included cognitively driven hikes. In one case the teacher was not trained in taking children outside and relied primarily on sharing

facts, without allowing the children to engage in their own inquiry. As an example, when I observed the hike, the teacher was showing the children the Mayapple wildflowers. She was trying to get them to focus on the shape of a “Y” which is the part of the plant where the flower forms. One child made the discovery on his own before the teacher gave the instructions, but the teacher was more focused on telling them what to look for than appreciating his discovery. She told me later that they are still trying to figure it out, how to take the children on hikes. They spent less than half an hour outside. Brenda shared with me that this group of new teachers is unfamiliar with how to take children on a hike, “It sounds easy to take kids on hikes but you can’t just go out and hike around and say now look at this and look at that. You’ve got to make it interesting and fun and know when to quit and know when to take that moment and not push it too much.”

Most of the programs took advantage of the nature center resources at their sites and had regularly scheduled naturalists or classroom teachers that were naturalists, but a couple of the sites did not, and this lack of environmental education expertise was apparent. One of the director’s descriptions of some of the ways the teachers are not developmentally appropriate in her program was representative of the others:

When I see those darn paper plates that have been made into ladybugs...[or] they’re not sitting on the floor interacting with children...that bothers me...[or] when I see that they don’t go outdoors enough. When they do go outdoors they just go out and play. And that’s OK to a certain extent. But they’re at a nature center and I know that parents expect them to go out and if it’s the fall and they want to pull apart a milkweed seed or even a dandelion and blow on it and understand seed

dispersal. That's what our parents are expecting. They're not expecting them just to go out and run around... Our classes do go out every day regardless of weather...20 minutes or half an hour, that's not enough. I want them to be out there for an hour. They've had such a good time and they've done so many things in the classroom that they don't get around to it. And I understand that, but they need to work harder on that. (Pat)

Research Question Three

How do directors in nature center based preschools incorporate elements of quality practice in their programs?

Finding 7. *A nature focus promotes in-depth investigations (i.e., project approach), intentional teaching methods, open ended art based on authentic experiences, academics integrated into nature topics, and active engagement in finding and feeding local animals. See Table 4.8 for examples.*

Table 4.8 Incorporating Elements of Quality Practices

Cases	Project Approach	Intentional Teaching Methods	Open-Ended Art	Integrated Curriculum	Engagement with animals
A	Girly Birdy project on birds	Nature focus, Reggio inspired	Painting snakes out of catalpa seed pods	Counting petals on flowers, graphing fish that were caught	Finding and feeding local animals
B	Birdathon – in depth investigation of birds	Nurtured Heart approach to discipline	More creative, less stressed and freer to come and do art	“I think it just happens” through nature activities	Animals in the classroom, raising wood frogs
C	Trapping animals	Puppets, starting day outside	Natural materials in art area	Academic skills integrated into seasonal themes, part of daily lives	Hiking to wetland and catching frogs
D	Investigating & building fairy houses	Montessori	Worksheets, product focused	Science area – bats w/smell jars, rocks w/wt. jars	Animals in the classroom
E	Farm and wild animals promote in depth investigations	Sense of community, inquiry based, starting outside	Making toad houses	Graphing egg collecting, labels on tadpole aquarium	Farm chores & wildlife visits
F	Children are immersed in topics	Art based	Art projects have specific outcome	Meaningful to children, Practice skills in themes	Catching turtles and frogs
G	Investigation of insects	Nature focus	Usually open, but some products	Print rich environment related to nature	NC teaching animals – bees, etc.
H	Investigation of collections	Using collections for study units	Worksheets, recycled art	Lining up nests by size	Animals in the classroom

Project approach. The project approach seems to be inherent in nature-based preschool programs. All of the nature preschools provided the opportunity for the children to engage in in-depth investigations into nature topics. Although not named as such, these investigations resembled the project approach promoted by Lillian Katz and Judy Harris Helm (2011). An example of an in-depth investigation was described by Roberta as a project some of the boys were involved with that had to do with trapping:

We read the book *Nuts to You* and squirrels were getting inside and they were getting into our feeders, so they problem solved the trap... They were practicing inside in dramatic play. And they actually did it outside.

But that was such an amazing event in some of our boys' lives that now they're doing it with their dads at home... At the feeders, out here they had...one of those plastic totes...like a fall trap that they have on a stick... And then the string came all the way into the front play area... And you talk about self-restraint, sitting there, waiting... And the others, [saying] "not now, not now." And then eventually they're under it and they pull and they all celebrate. And then you see all six kids up in the air... They get so into figuring out how to hide and how to camouflage themselves. And they'll go and get the burlap and the forts and lay it over them... But then you get into those important conversations of protecting wildlife and, you know, being humane and making sure you're taking care of them... Over the course of maybe a few weeks, every few days they might do something else related to these traps, or look things up in books related to that, and so it's sort of a longer-term investigation, longer-term project...like the project approach.

And another program seemed to take more of a project approach as they provided in-depth investigations. I observed the class during their "birdathon". They divided into three groups, and each child had a journal and toilet paper tube binoculars (that they had made earlier) to look for and keep track of all the birds they would find on their hike. The children were investigating the different habitats to find out which birds might live there. The teachers brought field guides so they could look up the birds they found. Later, inside, I observed the children looking through books on the floor, and the groups of them together looking for birds in the bird books.

Intentional teaching methods. In addition to the nature focus, many of the nature preschools used intentional teaching methods. These approaches varied by the preschool. They included starting their day outside, developing a sense of community, inquiry based teaching, using collections for study units, art based themes, the Nurtured Heart approach to discipline (developed by Howard Glasser), puppets as a teaching tool, and Montessori methods. In some, but not all cases, the preschool directors attributed the approach to the nature focus of the program. Other methods were used as a result of the staff backgrounds and training.

One of the programs used several intentional teaching methods including; creating a sense of community, inquiry based teaching, and starting the day outside. The director described how the first two were related to the nature focus:

Cooperative behavior... by virtue of the fact that we need to stay together in our outdoor explorations...it's implicit that the children are a group.... If you want to make friends with someone and you want to talk with them along the way, handholding is one of the ways that we try to instill that sense of being careful of each other... When a child runs away the teacher runs, really runs after them, stops them and invites them back to the group, and is insistent about that. Because we want to give the message that you're important to the group... I think it's important for the child who has run away to recognize that they're part of the group and also for the others to witness that we all need to stay together... That's a safety piece, but it's also a community-building piece... And just the idea that the

situations are worth mending in order to maintain a sense of community.

(Lori)

Inquiry based teaching. That's an intentional way of teaching...[in] a very child centered program... We're asking children questions a lot... It all becomes a part of this ongoing conversation with the children and helps direct and focus their activities... We always have a destination in mind, which was chicken feeding, but along the way there's many things to notice and you want to make sure that we're picking up on what they're noticing... Just honoring that children notice things and that it's important to take the time to do that. (Lori)

Another program was intentional in the kind of discipline model they used. They did not think that this had anything to do with the nature focus, but the children were safer outside when this approach worked. Liz and Brie described the approach:

We came upon *The Nurtured Heart* by Howard Glasser... It really solidified sort of what we were already thinking, 'cause neither of us were comfortable with time out and authoritarian methods... His whole thing is to focus on the positive...try to notice even little steps towards the right thing and...praise connected to a value like..."Oh, I see you're being very careful with that ant. That really shows respect. You're really respecting that ant."... We've tried hard to adopt that and it's been very successful... We've really tried to shift our whole everything to the positive...nurturing their heart... We really haven't had any discipline problems.

Open ended art. Some of the nature preschool directors made a point to describe how nature can provide opportunities for children to engage in open-ended art experiences, but it can depend on the teacher's abilities to provide these experiences.

Pat was particularly concerned that her teachers did not connect the authentic experiences the children have outdoors enough with open-ended art experiences and gave examples of how it should work:

I want them to see how these work. I'd love them to come back into the classroom and draw what they've seen. That's the real thing... I want art to be very open ended... [They were using] bowls and they were painting them to look like ladybugs. And I don't think that teaches children what a ladybug is. They need to collect ladybugs. They need to see real ladybugs. They need to draw their own ladybugs... If you want them to draw flowers you bring in real flowers and you put them on the table and you say, "Draw what you [see] or paint." Go out into the field and take a clipboard and take some art materials and take crayons or colored pencils... I really, really have a passion for open-ended art... 'cause I want it to come from the kids.

Liz and Brie have changed their approach to art after the previous director left. They wanted to be more child-focused providing open-ended art experiences:

She [the previous director] had been here so long and that was definitely an older way to do things, is to be more teacher directed... We definitely went for more child directed and child focused... I guess it was very project oriented so if we were teaching something it was through a project

that was teaching something, so it kind of had to come out a certain way...

We really tried to shift away from that so that instead of making a goldfinch that was a cut out shape of a goldfinch that kids would color and put a black wing on, we would put out all kinds of yellow and black materials and talk about how bright and beautiful they are. More open ended. So we try really hard, not to show a finished product of something that's supposed to be a certain way.

They noticed a difference in how the children reacted to the open ended art. They were less stressed, and freer to come and do the project, because it is optional, and more creative and child directed. Brie mentioned that, "They also seem more confident in their own writing and drawing with just coming up with their own ideas... They're so creative." And Liz said they are:

Generous towards each other... There's no competition... [In the past] we'd just fly by the seat of our pants and then Pam [previous director] would decide what we were going to do in the morning... And it usually entailed a lot of teacher cutting out birds or something... It was a little tedious... So I think that we've come a long way and I think we have a better program because of it.

Curriculum approach. The curriculum approaches used by each of the nature preschools varied, but all used the natural world as their basis or as a large part of their program. Academics were integrated into the nature topics in many of the programs. Most of the programs included active engagement with animals (animals in the classrooms and outdoors). For example, Lori explained how their curriculum is

connected with animals, “So we’re talking about curriculum wise it’s about the farm animals, it’s about wildlife animals, it’s about exploring the sanctuary and focusing, in particular, on an area like the forest.” And Sally explained their approach, “So, say we’re doing turtles, we’ll read a factual book about them, we’ll get our live box turtle into the classroom, have the kids feel them, observe them, talk about what they eat.” Pat felt that facts are less important than experience:

I don’t think we teach directly so that they go home with lots of facts...

We just want them to appreciate and to learn. But one day a little boy came up to [me] and he said, “Look Pat, look what I’ve got.” And he opened his hand and he had a worm in his hand and he said, “It’s a decomposer.”

The following three examples provide different ways that programs incorporate nature into their curriculum. Each has a different focus, such as Creative Curriculum or an art based approach:

We use Creative Curriculum... It’s not a perfect match, but it’s pretty darn good for us... The framework of Creative Curriculum is that it sets up the environment and it sets up the basic structure of the day. But it’s really about the environment. There’s 11 different interest areas... So we just infuse nature into that. So in the library our books are going to have more emphasis on natural things, from storybooks that may have a natural emphasis, to field guides... In the art area it’s still art, but there might be other natural elements that they can paint with or make collages with. Discovery area...we have collections of pinecones and other seeds and

natural elements. So we are able to take those interest areas and infuse nature into that. Outdoors is one of the interest areas... One interest area that they do have that we abandoned is computers/technology. We really feel like we do technology in other ways but we don't do the computer thing... We look at that technology piece...[such as] pictures they've taken last week...[and] there's microscopes and binoculars. (Roberta)

We developed our own curriculum using our nature classes as a start. It is a weekly seasonal curriculum with nature-based themes each week. Each weekly theme is also tied to a typical preschool concept, [such as] numbers, shapes, letters etc. Within the curriculum we accounted for all the required areas of learning and development, manipulatives, literacy, gross motor etc. Then in each area we created or collected activities that fit with our theme. So if our theme is mushrooms we will be counting mushrooms, identifying them in the forest, have art connections like mushroom stamping etc. (Diane)

They all draw an insect and it can look like anything as long as it's got the right parts... The kids love labeling. We write the words on cards and then they label the parts... And so they drew it... But they had to put the legs and the wings on the thorax and they have to have, you know, eyes and antennae... They worked together to figure out all the parts and then labeled them... Somebody did the legs and somebody did the, you can tell it's a different writing. (Brenda)

Finding 8. *Nature is given priority when the class starts its day outside, with unstructured time in a natural play area, allowing for child-initiated activities. The nature center grounds become a living laboratory that fosters a child's sense of place.*

Table 4.9 provides a snapshot of the preschool classes' outdoor time, on the day that I observed.

Table 4.9 Comparison of Outdoor Time Across Programs

Case	Start Day	Class Time	Time Outdoors	Observed Activities Outdoors	Weather
A	Inside	3 hrs	1 hr	hiking	Rainy, cold day
B	Inside	3 hrs	1 hr. 30 min	30 min nature play in wooded area, 1 hr hiking	Rainy day with mosquitoes
C	Outside	3 hrs/7 hrs	3 hrs/4 hrs, 30 min	3 hrs at wetlands/1 hr in nature play area, 30 min catching frogs, 3 hrs at wetlands	Sunny and warm day
D	Inside	4 hrs	1 hr, 45 min	45 min in fenced in area, 20 min in nature play area, 40 min hiking	Overcast, rainy day
E	Outside	3 hrs	3 hrs	30 min in grassy area nature play, 2 hrs, 30 min hiking, farm chores, snack	Sunny and warm day
F	Inside	2 hrs, 30 min/3 hrs	30 min/15 min	30 min hiking/15 min hiking in stream	Sunny and warm day
G	Inside	3 hrs/ea	1 hr/1 hr /3 hrs	1 hr doing ultimate fitness class/1 hr hiking in woods to pond/3 hrs visiting apiary and hiking, snack	Sunny and warm day
H	Inside	2 hrs, 30 min	5 min	On porch looking at animals across the lake	Sunny and warm day

Starting the class outside seems to give a priority to spending time outdoors in the natural world. Although all of the nature preschools professed to going outside on a daily basis, only two of the programs officially started their day outside. Both of these programs spent a good deal of time outdoors when I observed the programs. One of these programs spent a total of four and a half hours outside (out of a seven hour class time).

The other classes at this site were three hours long, and the afternoon class that I observed spent the entire time outdoors. The other program that started outside spent their entire class time outside (three hours). For both of these programs, the day I observed was sunny and warm outside. The programs that started their day inside varied in the amount of time they were outdoors on the days that I observed. One class decided to start their day outside (not typical) because they were visiting the apiary (bees) with a naturalist. It was a warm and sunny day so they spent the rest of their class outside. Other classes at that site spent between an hour and half their class time outside. Two other programs also spent half their class time outside. However, one was because their small group time was an outdoor activity on the day that I observed. Another program spent a third of their time outside on a rainy cold day (one hour out of a three hour class). Two of the programs spent very little time outside; one for five minutes out on the porch looking at the animals across the lake, and the other for 15 minutes hiking in a stream. Another class at the same site as the latter group spent half an hour on a cognitively focused hike. Both days, I observed these two programs, were warm and sunny.

At one of the programs that started their day outside, the nature preschool director described the nature center grounds and farm as “a living classroom” for the children. She talked about the curriculum as the natural occurrences that happen daily:

Whatever is happening each day that the child is here... So we try to incorporate as many seasonal activities as we can so that the children can witness them throughout the school year... The biggest challenge probably for this program is because we spend so much time outdoors, because we're a nature preschool, that the time that we have indoors to

actually work on art projects, science experiments, that sort of thing is very limited. (Lori)

This program has two sites. Two days a week are spent at each site. The day I observed the children they were at the farm site doing farm chores (feeding the chickens). They had no outdoor, fenced in play area, but started their day with self directed activities on a small patch of grass.

The director of the program that spent one third of their class time outside (one hour) when I was there to observe commented, “On nice days we’re usually outside for two hours.” The day I was there was rainy and cold. She continued, “If it gets to be May we will take the easels and stuff and we go outside... We’ll do water activities outside. We will paint outside... The den could go outside... We will be outside. September it’s the same thing” (Lois).

Another program, that spent half their class time outside on the day I observed, has no fenced in play area for nature play, but they use other areas of the nature center for nature play.

Sometimes we just hike and we look at what we see. Lately we’ve been hiking to a destination and kind of hanging out there. Which seems to be better because we have some slow walkers and some fast walkers and it’s very hard to keep 18 kids together so going to a destination is a great improvement...And those two destinations have been so popular with everyone... The building site...and then the village. And both of them, it attracted everybody...They’re all playing (Liz).

And another program, that spent nearly half their time outside when I observed, had more of a separation in the approach used between the inside and outside time:

Just seeing that balance of doing some real learning academically type inside, getting the children to learn self control and independence so that they can sit down and learn. And then you know outside let them go. Let them have their kind of free time again within the boundary of whatever the rules are. The confinement of space or time or don't hurt people.

(Diane)

Research Question Four

What goals do directors of nature center based preschools have for their program and curriculum, and how do these inform the environment and experiences they provide for the children?

Finding 9. *Nature center based preschool program goals include; empowering children to act with an environmental ethic (i.e., grounded in local nature), developing a sense of community (i.e., getting along with others) while meeting young children's developmental needs, and developing academic skills through authentic experiences.*

Table 4.10 provides the goals that the preschool directors described. These are similar to the goals outlined in their respective preschool handbooks (see Appendix E for more details).

Table 4.10 Program Goals as Described by Directors

Cases	ECE goal	EE goal	Other goals
A	X	X	60% EE (respect for env.), 40% ECE (socialization)
B	X	X	Socialization, grounded in nature
C	X	X	Connecting kids to nature & kindergarten readiness
D	X	X	Kindergarten readiness & environmental ethic
E	X	X	Building community & love for the earth
F	X	Not explicit	Kindergarten readiness & love of learning
G	X	X	Respect for nature & kindergarten readiness
H	X	X	Kindergarten readiness, family involvement, respect for nature

Dual goals. All of the nature center based preschools have early childhood goals, and all but one have explicit environmental education goals. Most (seven out of eight) of the nature preschool directors talked about the dual role their nature preschool plays, in that they are influenced by the nature center mission of encouraging an environmental ethic, as well as, wanting to meet the needs of early childhood development for socialization and being ready for kindergarten. Therefore, many of them discussed the natural world as providing opportunities to do both. Roberta said they are, “two fold...to provide a quality early childhood educational experience, that’s developmentally appropriate, preparing kids for kindergarten... Then the other part is to connect kids to nature. To get them outside and to build a life long connection with the natural world.”

Three of the other nature preschool directors summed up the dual goals this way:

The goals of our preschool program are to provide a multisensory experience for children in nature. Using nature as a backdrop to everything that we do, when we talk to children about their growth, in terms of making friends, interacting with nature and respecting the environment. So [environmental organization’s] overarching mission is having children be

comfortable in nature so that they can grow up to be stewards of the earth... In terms of individual growth and development of children, we're also a licensed program through the Department of Early Education and Care. So we feel like we're responding to two different entities...providing a positive experience for young children [in the natural world and]...tailor[ing] our program to the individual needs of children... Respect...respect for themselves, respect for the environment, respect for the animals... Helping them to express themselves and their ideas. (Lori)

Two major goals; one, um, teaching kids how to get along with each other. Social skills are really all encompassing, um, and then we just try to ground them in the nature that's around us... We try to stay real local and just learn about the lifecycles and things that are going on around us throughout the seasons... We found that we couldn't really teach much about nature if the kids weren't happy and weren't getting along with each other, so, we just really wanted everyone to be kind to each other and we sort of encompassed that with our goal of be kind to each other, be kind to nature, be kind... To be a good person, respect the environment...respect each other. (Liz)

So the goals of the preschool are to provide the children with a comprehensive preschool experience, but to also provide them with a unique opportunity to experience unstructured playtime in nature... We really feel that preschool children can learn socially, emotionally,

physically and cognitively through nature-based programming and playtime. We believe that this type of educational program creates a love of learning in the child that will carry throughout life. They are encouraged and supported in their inquiry and exploration... By combining the goals of our [nature center] mission with known conventional preschool goals, we were able to create a set of goals specific to our preschool program. (Diane)

This description focused on learning respect for the natural world and each other:

One of the things that I really think is important is the fact that when kids are given some unstructured free time and they're outdoors, they learn to appreciate the environment. And if you learn to respect and appreciate that they also learn to respect and appreciate fellow friends, coworkers, and everything else that goes along with that...[and] the appreciation of the earth and what it has to offer. (Lois)

Another director felt that the goal of providing a natural childhood was important:

I feel that if we can give them a little bit of the kind of childhood that a lot of us had. Where we were able to go outside and just run free and kind of explore the neighborhood and get dirty, get muddy, maybe get a little bit hurt once in a while, because we challenged ourselves, that's really what I'm hoping to give them... A natural childhood... A really joyous childhood as opposed to being inside a building all the time. (Diane)

The nature preschool that did not explicitly mention the environmental education goal is a parent cooperative and is not governed by the national park where they are

located. Their program uses the natural world as a vehicle for learning, but some of their units of study are not necessarily based on local nature. The teacher who started the program talked about their goals this way, “We have regular preschool goals...[being] prepared for kindergarten... So there’s math, science, pre-reading skills taught, but we teach it through nature units...My main goal for the children is to love to learn things. To take that curiosity they have and teach them how to use that to learn things. (Brenda)

Environmental goal. Most of the preschool directors spoke about the goal of developing an environmental ethic, usually related to the nature center mission. The following quote expands on this idea:

Our goal again is that they have this connection with the outdoors and that that is really valuable to them. That they made that emotional connection so that they have changed their behavior. Which really comes back to environmental education... It seems that the research would support this, long term because of this early positive experiences outdoors they’re going to have more concern and care for environmental, whether it’s in voting or how they use their own land or getting the value of getting their own kids outside...is important for their overall health. So if the kids now have that desire to be outside, then they’re more likely to take their own kids outside. (Roberta)

Liz added the idea of being grounded in nature, “Leave feeling connected to this place and just feel grounded and comfortable in nature...to respect nature...have a respect and marvel for what’s outside. And I think they’ve also learned a lot. You could

hear all the birds they knew... It's amazing how many wildflowers that they can identify."

And Lori commented on what she hopes children will take away from the program short term and long term:

I hope that they'll remember how much fun it was to interact with the animals. I hope that it takes some of the fear away for children that were really reluctant to walk in those noisy barns for the first time. I think that it also has a calming effect on children when they're able to be helpful and work cooperatively with their classmates...I hope that they come back...[and] see this as a place that feels like home to them... [They] feel so comfortable moving around the sanctuary that whatever they see whether it's a tiny insect or a fox or any of the captive wildlife that they'll understand.

Developmental goals. All of the nature preschool directors spoke about goals for meeting the developmental needs of the preschool children. Socialization skills were the most important skills mentioned followed by kindergarten readiness skills (which include socialization skills, but in many cases were more related to academic skills).

Socialization skills. All of the directors included goals for the development of socialization skills including; self-confidence, social skills, independence, problem solving skills, and respect. These three quotes provide the essence of all the directors' views. Liz expressed the outcomes she thought were important for the children attending her program including, "self confidence...social skills...the ability to say what's on their mind and work out a problem...[and] work together."

Diane spoke about developing independence, “Developing their concentration and their focus and some independence... We do kind of challenge them a little bit more, because you know we’re also asking them to go out in the woods and explore and do things that maybe are not within their comfort zone...developing that independence.”

And Roberta spoke about problem solving skills and respect, “Coming back to asking questions...[and] problem solving... Respect for each other and the environment is a huge one. I mean that has so many different components. From how do we handle a frog to how do we treat each other, someone’s who’s different from us.”

Kindergarten readiness skills. Diane’s explanation of kindergarten readiness skills echoed many of the other directors’ thoughts:

We have found that with this base it is easy to include normal skills that prepare the children for kindergarten and elementary school, such as counting, reading and writing... In general we like to see the children progressing towards being able to name most of the letters and start making associated letter sounds. We see that most children will be able to name the digits from one to nine and they have an understanding of the relationship between number and quantity. Also I work with them to ensure that they can hold a pencil with some mastery of the fine motor skill and that they can write their name. These are the very basic skills that I like to see academically before they go to Kindergarten.

Sense of community. The need for the class to work as a group and to develop a sense of community was present in all nature preschools, especially in regard to safety

when out on the trails. However, Lori suggested that this was an intentional part of their program and therefore articulated this goal particularly well:

We're trying to create community... Really forming a strong sense of identity within the group... The children are together in this group for the entire session and for the entire year. So we're out for two hours. They're doing a cooperative activity, such as a farm chore. They wash their hands around the same time. They snack at the same time. They wait for each other. We look at books before snack time, when we're indoors. We eat together. We do the calendar together, the weather, any song, poem or chant together. We have wildlife, this is together. We do the closing circle together. So it's that constant reinforcement... In traditional preschools recess or outdoor time is generally time at the end of the morning or the end of the session... Once they get outside, you don't have that feeling of community anymore... [But in a nature preschool] it just creates a harmonious experience for the kids. And when there are behavior issues it's easier to correct them. That's one big difference I've found.

Authentic experiences. All of the nature preschool directors mentioned that nature allows their program goals to be met with authentic experiences. This is one of the things that make the nature preschool program unique. Two of the nature preschool directors provide the following examples of how the nature preschool experience provides for exploration, learning in different ways outdoors, and is unique:

The exploration component is probably by far and away the biggest opportunity that the children have because they're outdoors from

September to June, following the seasons, having to dress appropriately, thinking about what the animals are doing. We do a lot with migration, hibernation, and winter resistors in the fall as we're preparing for winter. And then to do winter tracking and find out what these winter resistors are up to over the winter months. And then with spring we'd be talking about pollination and metamorphosis, and the life cycles, they just get to follow the seasons...all these animals and plant life through three major seasons. It isn't just coming out of a book or it isn't just a field trip. It's something that they're really living. (Lori)

I don't think they're going out birding in other preschools... I don't think they're going out in the woods and building structures... We've had high expectations for them and they've hiked from like day one, long, long hikes through the woods... We've dug up clay, there's a clay pit... We've tapped the maple tree. We've picked apples for apple cider. We have our own apple cider press... We picked grapes and make grape jelly... collect acorns, smash them, take the meat out of it, boil it and grind it and make acorn bread. (Liz)

Research Question Five

What informs the program and curriculum?

Finding 10. *In addition to the natural world, a combination of the preschool director's background and training, the nature center mission and resources, and philosophy of education inform the preschool program and curriculum. (See Appendix F for details.)*

Director background and training. Quality nature center based preschools tend to have a champion that started the preschool, directs the vision and/or implements the program. Character traits and background include being a life-long learner, having a personal mission of protecting the earth, and being someone who has early childhood and environmental education experience or worked with another teacher combining early childhood and environmental education in implementing the program. Several of the directors described experiences that influenced them to work at a nature preschool, such as, time spent outdoors as a child, being a mom, and reading books by experts in the field.

Education background. All of the nature preschools have a director, or in one case lead teacher (that started the program), that have an early childhood background. Six have an associate's, bachelor's, or master's degree in early childhood education or elementary education. The other two have courses in early childhood education and one completed her training in Montessori education. One half of the directors (four) have a background in environmental studies. Of those four, three have undergraduate or master's degrees in a related field such as wildlife management, interpretation, natural resources, parks and recreation, environmental science, and oceanography. The fourth director took natural resource studies courses in college and learned natural history information on her own.

Early experiences. Five of the preschool directors spoke about spending time in the natural world when they were children as being an influence on starting or directing their nature preschool. Roberta described the outdoor influence that her family had on her, "I grew up on a organic vegetable farm and the rest of the family were

biologists...so outdoors was definitely just part of our lives. So I knew I wanted to do something like that and so then environmental ed was sort of where I landed.”

Lori described her early experiences playing outdoors, “I’ve always loved being outdoors. As a child, I was always the child turning over every rock, dangling worms from my finger, you know, pulling caterpillars off trees, just loved being outside, real tree climber person so, just kind of a natural fit.”

And Brenda recounted her childhood nature play, “I grew up in West Virginia and spent all of my time outside. I lived on a ravine with a huge woods and we played in the creek.” Two more directors described their childhood experiences, one in the country and the other in the suburbs of a large city:

I’ve always been an outdoor kid... We moved to the country when I was six. And we had a creek right next to us and we had a woods right behind and the man next door raised cows and chickens... There was one other family of kids there and we were outdoor kids... We would be playing in the hay mound... We were out in the creek, we were fishing, we were mud stomping, we were back to the woods or we were on our bikes...we lived in the outdoors. (Lois)

The inspiration for all of this... I was reading some of David Sobel’s books about children’s special places and it just totally rang a chord for me... Anybody who’s environmentally minded, they have that one place in their mind that they went to as children. And I did... When I read the two books...he had explained the feeling that I always had that I couldn’t explain... It was so wonderful a moment in my life... I was the oldest...

[and] there were like five of us. So it was like four, eight, and me ten... Well it was my neighbor's yard. And they had all these like yew bushes and they had, um, like a hydrangea bush, sometimes they were offices, other times they were laboratories... They would also sometimes be our stores... And there was a dry brook that we would jump, make rope swings over... And there was a culvert under the bridge that we would explore in there... It was just like being free outside... And I think it really changed me as a person, 'cause I had been very shy before that... After that I kind of found myself. (Diane)

Maternal experiences. Several of the participants were mothers. This was a factor in their own development as teachers and directors. Lois explained it this way, "The mother side of me says 'children need to be outdoors', if you talk to my children, they'd say 'Yep, mom stuck us outdoors and locked it and said 'don't come home until dark'. It's not quite true...but we were always an outdoor type family."

Lori's interest started when she had children, "I got very interested in child development when my children were born... [At] a cooperative preschool...when my son was leaving, I got hired as a lead teacher for a kindergarten class. I really loved that very much."

Lisa started the nature preschool as a parent cooperative after her children attended the nature preschool program that Brenda had started, "I think my kids going through this program, I wanted it for other kids is the big thing for me." She doesn't teach but she's the driving force behind the preschool and has organized the whole program. She has the vision, keeps things going and keeps adding new programs. And Brenda

started teaching preschool because of her child, “And I never wanted to teach but once I had my own child it was kind of like this is really cool... Volunteering in her classroom is what got me interested in preschool. Just thinking, wow, what a wonderful age and they’re just so alive and so fresh and excited.”

Life-long learners. Several of the nature preschool directors talked about the value of education and being life-long learners as being important in their development as nature preschool directors. When returning to school for the third time, Lois said, “Education’s never wasted. Had no intention initially of getting a degree. Just went for the classes... I created my own program... It doesn’t really matter to me whether I graduated or not. It’s education, it’s fine. Um, but I did.” Liz described her continuing education this way, “I did natural resource studies as an undergrad which was pretty basic, but I’ve been a self learner... I got interested in birds, so I learned about birds, and I got interested in wildflowers and learned about wildflowers. I got interested in butterflies and learned about butterflies, caterpillars and insects.”

Roberta, as education director, decided to start the nature preschool while she was in her master’s program, “I did some of my master’s with early childhood... I did a project instead of a thesis, was the proposal for this program... I’ve learned a lot. I’m still learning a lot.” Diane described her continued education, “I have a degree in environmental science and then I have a master’s in oceanography... And then I had to go back for training, the actual classes in early childhood to get the head teacher certificate and then I’m finishing up now the Montessori early childhood training.” After finishing her CDA, another preschool director went to Bank Street for her master’s degree:

I loved every minute of it... It was the first time that I really liked college work because people were intellectual [and] they were mature. And you could have wonderful conversations. I could go to class on Wednesday night and come to work on Thursday morning and put into practice what we talked about... There was theory in why you do what you do... But this was a totally different experience 'cause I was liking what I was doing... Obviously not knowing anything about environmental education, but knowing a lot about early childhood... I've learned some things about nature and the environment. (Pat)

Brenda described how teaching, in general, has changed over the years, showing the creativity she brings to the program, "I taught first, second and third... I could do it any way I wanted. I could have an art lesson or a music lesson right in the middle of reading because it applied and that's the beauty of this program to me is to be able to bring everything together and teach that way. You can't do that in the schools."

Personal mission. Many of the preschool directors felt a sense of ownership of the program and that this was their personal mission. Diane articulated it well, "I mean to me this is my baby. I mean I was scraping paint and, you know, oil off the floor so I have a vested interest... I started the school, built the curriculum based on my background and my knowledge of what I've learned." And Lori got a little emotional talking about her personal mission that invests her in the program, "My personal mission comes through and that is that when children learn these skills at an early age and they learn that this is rare and that they will want to go wherever they are in life that they'll remember that

wildlife and the earth is to be honored. That these places are very special and worth preserving.”

Early childhood educator and environmental educator partnerships. If the nature preschool director did not have a background in both early childhood education and environmental education, they often worked with another teacher to supplement the skills they were missing. Two examples follow:

I think I've been in the problem solving skills and Brie's been on the kid-centered art so we've grown from each other for sure and that's made our program better... I'm an environmental ed background and Linda's sort of got the early childhood background, so together we really help each other a lot. So the birds and the butterflies and all that, you know, the flower identification and all that stuff were sorts of things that I knew more about and she knew more about sort of traditional early childhood philosophies and goals and things like that, so it's been good. (Liz)

I pulled Joan aside and asked her if she would be the other teacher... She was one of those good old ones that didn't have a college degree [but was a naturalist]... And she always said, “Oh, what do you think Sally, you have the college degree.” And I'm like, “No Joan you have the nature all up there in your head.”... She was my mentor... 'cause she had worked here probably eight years as a teacher naturalist... I got a good background training from her... I pretty much did the schedule of the day, but then she implemented the units and taught me all the good old science background... 'cause she knew what collections we had. (Sally)

Nature center mission and resources. Excellent environmental education resources and a good relationship with the nature center help to inform some of the programs. The nature center missions and resources are similar at each of the nature centers. However, the relationship that the preschool has with the nature center at their site varies from program to program. Some of the preschool programs started as a result of early childhood programming at the nature center, informed by its mission. Three of the programs are housed in the same building as the nature center and four of the programs are housed in a separate building from the nature center. One program has a separate building for half the week and uses the nature center building the other half of the week. However, the location of the preschool program does not seem to have an effect on the relationship.

Three of the preschool directors described their relationship with the rest of the nature center as being seamless. Other programs had good relationships, but not as cohesive. For example, Liz talked about the structure of the preschool within the nature center, “Before we kind of came into power it was really its own little entity [the preschool]... We’ve tried to incorporate ourselves more within nature center’s and [the environmental organization’s] goals which has actually been quite nice.” Two examples of the programs that had a seamless connection and grew from existing classes follow:

We don’t have our own board; we don’t have our own budget... This is considered an educational program of the nature center. In that sense very connected...it’s very joined together. We’re physically in here, which works out well because we take up a lot more time and space and so we need a lot more. But I think in mind and spirit it’s very connected... We

have had a lot of early childhood classes here at the nature center for a long time and our early childhood programs became really popular... So we decided we can expand this to a preschool. And we took a lot of what we do there...based it on a seasonal cycle, what would we find... The arching goal we coordinate with the mission of the nature center, which is to inspire and nurture an environmental ethic in people and we feel that, you know, that can start right from the beginning. (Diane)

[The] preschool, it started out as a program... [The nature center's] overarching mission is having children be comfortable in nature so that they can grow up to be stewards of the earth... It was a real goal of [the] Farm to have a preschool on site... I think that there's growing respect for the program just because people seem to really like [the] Farm... We actually are in contact with [the nature center] just virtually every aspect... It's very well integrated...absolutely, very strong [relationship]. (Lori)

The nature center resources available at each of the nature preschools inform their programs. As an example, Sally talked about the resources they receive from the nature center. These include 600 acres of diverse habitat, outdoor animal exhibits, and collections of artifacts. Sally focused on the collections, as they tend to inform her preschool program and are a big part of the curriculum, "So if I am doing a butterfly unit I can just pull that manila folder out... [We have] invertebrates and birds, reptiles, mammals, nest[s]... skulls, a lot of our study mounts...hands on study guides...inventory lists... So it really has enhanced our program by leaps and bounds. And it's nice to have it right here where the preschool is."

Lisa and Brenda's program have an interesting relationship with the National Park Service where they are located. The preschool has to follow the rules of the National Park and the previous superintendent worked with the parents to provide a home for the preschool. There is a new superintendent at the park service that isn't as supportive as the previous one. Lisa explained how the original park superintendent was an integral part of starting their nature preschool:

The Park Service isn't very helpful... They're hurting for money... The superintendent that's here right now is not accommodating in the least bit... The guy who was here before was wonderful...and he didn't want to tear down this homestead... And he loved kids... He's the one that helped us get this whole thing going... I imagine he did the learning center, too... His idea was, "well how cool that would be to have all this sort of educational stuff on this little road..." The new guy isn't so keen on partnerships.

Preschool philosophy and curriculum. Although all of the nature preschool directors profess to be primarily nature focused, more than half of the preschools have a particular philosophy or curriculum that informs the program. The following information is specific to three of these approaches, Montessori method, Creative Curriculum, and art focused curriculum.

Diane's training in Montessori education informs the inside part of her preschool's class time. The classroom was set up with Montessori materials and methods, and although this method can lend itself to a nature based approach, it seemed to be less

nature focused, as there were not a lot of natural materials available for the children to use:

The Montessori model which we follow of younger children mixed with older children and various levels of activities, allows for cooperation among the children naturally... The children choose their own work rather than have it teacher led. Of course, the whole classroom has been carefully designed by the teacher to entice the children into works that will help them learn...concentration, coordination, gross and fine motor skills, etc.... The children are taught what is acceptable behavior and how to use the materials and works... Within that framework of order then they are free to make choices on their own.... The child is working on the same work over and over again, it usually means there is something they are learning and need from that work.

In addition to the influence of Creative Curriculum for setting up their classroom environment, Roberta explained how using this approach also informed the length of their class time:

One thing that Creative Curriculum has outdoor time, but, of course, not the group excursion time. That's something we added, our hikes... What we're finding is, in order to provide an hour of choice time in the classroom, which is really what Creative Curriculum emphasizes...we weren't able to do that in a two and a half hour time frame because we wanted to spend so much time outside... we ended up adding a half an hour. So we are now a three-hour program.

Brenda and Lisa described how the art focus of her preschool informs the program:

We do a lot of cutting and pasting and making... It's all for that skill, pasting and cutting and coordination skills... They all made giraffes... We made them out of, you know, corn meal containers and paper towel tubes... So they help you construct them and then they paper Mache them...and then you paint the base coat and then finally you get to decorate them... It's not bad when you have eleven kids who are six and are capable...but to do 40 preschoolers with 40 giraffes are exhausting... The curriculum is a preschool curriculum. It's skills that you would use in all areas. But we just adapt it to whatever the unit is... Since we've been here we generally start the year off with a unit of "right around us". This is our place here and the habitats. And then as we get into the year, the winter, we travel. This year we went to Australia and to the grasslands and the savannahs of Africa and we went to the Arctic.

Research Question Six

What impacts the program and curriculum?

Finding 11. *Physical space, parent expectations (around academics), product based art projects, nature center policies and procedures, and kindergarten readiness skills all impact the program. Parent education on the benefits of nature for child development is important for providing a DAP program. (See Appendix G for more details.)*

Physical space. The indoor and outdoor physical space allotted to each nature preschool varies based on the nature center site and budget. Indoor spaces of most of the

nature preschools (six) were existing spaces that were renovated. One of the programs built a new preschool building after using an existing space for the first couple of years. Three of the spaces used by the preschools are shared space for other programs, one of which is a multipurpose room that has dividers for the classrooms. Limitation of the indoor physical space impacted the schedule and flow of several of the programs. For example, a lack of children's bathrooms in number, size and location (not being adjacent to the classrooms) affected six of the programs. Limited space or shared space had an impact on available activities, such as dramatic play, for the children. Being able to be inside and outside during free choice time was limited by a lack of doors opening outside from the classroom or difficulty maneuvering a staircase. Roberta explained it this way, "One thing we didn't get we would have liked, is doors right outside, directly out... where they put their dirty shoes and their backpacks." Two more examples follow:

Because we're in a different building it seems like we're separate... It's not perfect, because it's a house that we had to convert... The upstairs, downstairs thing would not be my choice... Those big long stairs to go downstairs are scary... You know only one child goes, the second child can't go until the first child's half way down... The upstairs space is beautiful, it's cute, it's very cozy but it could be bigger. We could have more bathrooms... The cubby room could be bigger... The loud, kind of chaotic movement, aimless movement particularly in the classroom that does happen... I think just [because of] limited resources and smaller space... Those active children they're trying to be active, but they can't

inside so that's hard for them... It gets chaotic...little packs roaming the classroom not choosing work to do... It starts getting loud. (Diane)

The kids can't see out of our windows. They're too high... I would build it so it's cut off from the public. That we'd have our own restrooms, for safety... I would love to have more wall space.... I'd love to have walls with either the kids paint it or the parents come paint it with the kids...

[like] in the corner, the paintings of the prairie grasses and butterfly mural... The bulletin boards, I hate 'em 'cause they're ugly, and they're high... Get their artwork down so it's at eye level with the kids. The cupboards, there again they're high... The coat hooks, it's crowded down there when we have both sessions, the hallway's so narrow. (Sally)

Similarly, the outdoor spaces varied by program. Three of the programs have fenced in outdoor play areas, in addition to the nature center habitats. However, one of these is not a natural play area. Although they do not have fenced in play areas, four of the other programs have natural play areas that the children use for nature play and the other program has places on the nature center grounds that they use for nature play. The program with a fenced in area that has traditional play equipment provides an example of the impact the outdoor area can have on the program. This program has a small fenced in outdoor area with traditional play equipment (primarily there for licensing purposes) that opens into a larger natural play area that is not fenced in but has natural borders. When the children go outside they start in the fenced in area and line up at the gate to go down a hill to the natural play area. When they left the fenced in area I observed the children running down the hill and it resembled a giant "exhale":

That's how I describe it and I've almost wanted to like tape it, the decibel level, because it's so loud. If you keep them in there [fenced in area] longer, obviously it escalates and then as soon as you go out they spread out and the children who are quiet might be sitting over, you know, building something. And other children who are playing a little more rough with sticks and running around, they all have their own space. The children who don't want to be involved in the loud games can find spots... I think we're very lucky because the nature center is so big and has so many different habitats. Like we have big meadows and we have the pond and there's you know rocky ledges and, um, we have a bog. (Diane)

Liz talked about their outdoor space and how the weather and bugs impact them:

The outdoor space is good... We're so used to not having a playground that we just go with it... That's kind of what makes it so special, too, is not having swings and slides... It's real buggy. The bugs can be really annoying... We're either in the blaring hot sun where kids are getting fried, but then if we go in the shade, we get attacked by mosquitoes. There's a lot of poison ivy out on the trails, which makes me very nervous... I guess lack of snow can be kind of boring, too. Not that there's anything we can do about that...sort of living with the conditions...We just have to deal with what we get.

Parent expectations. Parent expectations, for most of the programs, were in line with the outdoor focus. Several of the nature preschool directors said that the parents that sign up for a nature preschool are not typical. Such as Lois' comment, "Our parents are

sort of a unique group because they do appreciate the value of the outdoors.” Liz also said that the parents appreciate the outdoors, “ ‘cause we go outside every day. People love that... They love that no matter how cold...we go out in the rain...[and] we don’t wimp out. We go out...[in] rain, snow... I think that’s the thing we hear the most.”

However, a few of the programs remarked that some parents had unrealistic expectations of the academics they think should be included in the programs. One program added a Pre-K class in response to these expectations:

This isn’t a fit for everybody... I guess the biggest criticism we get is that it’s not traditional... And their child isn’t learning the academics... They want kids to come out of preschool reading... Mostly it’s lack of knowledge of what they should actually be doing when they head to kindergarten... They expect kids to come home with worksheets of letters and that’s not what this program is. It took me a while, you have to just say, this program isn’t for everybody. (Lisa)

It’s a low-key environment, they’re down to earth group of families. They chose this because it’s OK with them that their children get muddy during the day or go home with paint on them... They wouldn’t choose the nature center if they had trouble with us being outdoors every day... I had a parent that didn’t think her son had got enough academics, was ready for kindergarten ...[but most of the families] like the fact that we do go outdoors every day... They have the same values, attitudes, and behaviors about the environment. (Pat)

Well, one of the things that we've always both agreed on [with the nature center director] is when a parent comes to us and says, "Well are they going to be writing or are they going to be doing their math?" She said, "Not in the 3 and 4 year olds. If they want to, we'll start some of that when they're at Pre-K." That's one of the reasons why we added it. (Sally)

The nature center director added, "You do cover that in the Pre-K and I think that's one of the things that...parents suggested and asked for, and we went ahead and did, is that in that Pre-K program we are getting them very ready for kindergarten" (Nina).

Parent education on the benefits of a nature-based curriculum was felt to be important in making the case for not focusing on academics:

They don't believe us that we're going outside every day. So we're sort of convincing them that what we say is really what we mean... I've tried to really get them to understand what we're about and that it is about free play and outdoor time and this is how they're going to learn... I think most parents start to get the basic concept... I think once they get here and see it they realize that, if anything, they might be developing even more skills... It's the concept that our kids are going outside, that it's a little bit cutting edge, maybe even a little bit trendy... They want their kids playing and learning and being outside. (Roberta)

Product based projects. Two of the programs I observed were heavily focused on product based projects that impacted the amount of time they could spend outdoors on a beautiful day. One of the teachers in one of those programs explained the work they were doing that day and why:

They're making butterfly mobiles... Yesterday they did sponge painting and splatter painting, but what was interesting was the motor skills of it...

It's huge amounts of accumulated learning, projectile, strength, fine motor, eye hand, color combinations. How do you pick a color that goes and looks right? Warm colors, cool colors, all these little decisions they have to make... And then today is cutting skills... I pushed this time to have them cut this because we've been working on curved cutting all year and so this is sort of the graduation exercise... a Mother's Day project...

Talk about fine motor skills. (Ann)

I observed another program that also had a Mother's Day project that interfered with going outside on a beautiful day. The teacher in this program also gave the children a worksheet to color.

Nature center policies and procedures. Nature center policies and procedures can have an impact on the preschool programs, especially if there is a lack of understanding or communication between the preschool and the nature center. Three of the directors provided examples:

And because we're sort of umbrell'd underneath [environmental organization] it's just a very unusual situation, we don't have any control of our budget, hiring, hourly wage, nothing... There's a lot of decisions that get made without our input, which feels a little frustrating since we're the people who are here most consistently. So I guess I'd rather be more involved. (Liz)

We're heavily influenced by [environmental organization] because of their education background a lot of our policies come from there. Our contingency plan comes from there. Our addressing child abuse comes from [there]... We use a lot of program materials...from the farm that's provided. So it seems like we're working with many influences. (Lori)

The nature center expects our parents to be involved in the nature center activities, however, many parents say, "My child goes to the preschool, I'm not part of the nature center."... No matter what we've tried over 13 years to build a relationship, even sometimes staff members will say, "I'm only a preschool teacher and I don't have to go to all these nature center meetings." But if we didn't have the nature center we wouldn't be a preschool and if we didn't have the preschool there might not be any money to have the nature center, but, there's still a lot of that disconnect.

(Pat)

Kindergarten expectations. What the nature preschool directors perceive as kindergarten expectations, have an impact on some of the nature preschools. Lori described the need to follow the state's kindergarten readiness system, "Department of Early Education and Care's developed a quality rating system...school readiness, school preparedness features in their programs. I think that we do a really good job of that."

And Brenda explained the activity-based assessment they do to make sure the children are ready for kindergarten within their program:

Toward the end of the year, the teachers will do like sort of a checklist.

We know that kids need to know these certain things before kindergarten

and communicate to the parents... They did polar explorers and you have to do physical things like, hop on one foot... The hopping and skipping and balancing and ball throwing... It might be astronaut skills if you're doing space... You can count down from ten or you can count up to 30. But there's always something on it that everybody can do so it's just a non-threatening kind of thing... Like during habitat, learning your address and phone number... There's no failing... It's very [activity based].

One of the preschool directors has taken on the mission of changing the schools regarding kindergarten:

Almost all of our thorny discussions center around kindergarten. Are they ready for kindergarten or not? There has been a big push to hold kids back... [Parents say], "Well I don't know if they're ready, there's so much pressure in kindergarten." And that's sort of bigger conflict that we're having as a community between early childhood and kindergarten in public schools... We just really believe that most children are ready for kindergarten... There are, of course, exceptions to that, but they need to be pretty significant learning delays or social delays... If we don't stand up for it, why would the schools ever change? ... We believe it so strongly... If they're five on December 1st, which is the kindergarten date [here]... then they should go to kindergarten and we won't take them... For all the programs that are funded through the state and Head Start, we have a consortium group that gets together. And one of the things that

collaborative group, consortium wants to do is define what does it mean to be ready for kindergarten. (Roberta)

Finding 12. *The quality of the program is impacted by a lack of early childhood educated teachers (i.e., lack of DAP found in the classroom and emphasis on cognitively focused hikes) and lack of environmental education training (i.e., lack of nature focus on hikes and not making outside time a priority).* See Appendix G for more details.

There are no consistent requirements for teaching at a nature preschool. Each program is governed by state licensing, often not requiring a college degree to be an assistant teacher or only a two-year degree to be a lead teacher. Therefore the teaching staff at the nature preschools varied as to their background, training, and education level. Most were low paying jobs and this also affected the quality of the applicants. In some cases the quality of the programs suffered. Several of the directors offered comments as to what is lacking in finding and hiring good teachers, existing backgrounds of teachers, and what they find appropriate and necessary for their preschool staffs:

I think finding teachers, though, is the hardest things with the nature based preschool... Not so much they don't know all the stuff, but they didn't have that experience themselves... You know, I think people the age of the teachers we would like to have, they didn't have those kinds of experiences. (Brenda)

What we try to get is teachers that were teachers that are looking for a part time job to supplement their income... We've got a couple teachers right now that don't have that [classroom management experience]. That are really just parents that are very creative that love the program that had an interest in being outside and with the kids... It would be ideal to have

someone who's had teaching experience... Early childhood is ideal... One thing that we have struggled with is to try to find somebody who has that [nature or biology] actual background... It's more important to be able to interact with the kids... Most of the people we run into with environmental backgrounds, they're used to older kids... They're interpreters...[with] no interaction or hands on [approach]... It's a hard package to find that perfect person. I struggle with it constantly. (Lisa)

We tend to draw more people with the nature, environmental type stuff. Just by being the nature center... We don't get a lot of early childhood people walking in the door. It's more like, "Well I like nature and yeah, I worked with children once or twice so maybe I could do it", that kind of thing. (Diane)

One of the preschool directors described the frustrations she has with her preschool staff. On one hand she feels that they are not nature focused enough on the hikes, yet she also feels that they need to primarily have an early childhood background:

Lillian Katz's and Sylvia Chard's idea of a project approach is awesome... We don't delve into some of the studies as much as they could... I do know from the lesson plans that I get from the teachers and what their focus is outdoors and I'm 80% happy with what they do out there... They could be a little bit more nature focused... It's not just a walk through the woods...it's for the purpose of exploring and learning... I want them to have that early childhood background. I have teachers that...have an environmental education background. And I hear things that come out of

their mouth that I know isn't appropriate... I think one issue is that for some of them, a lack of education. And they're paid so poorly they can't afford to continue on with college. I'd love to have them all have a four-year degree. I'd love to have an environmental educator and an early childhood educator... I'd like the staff to...have that love of learning.

(Pat)

And another preschool director described her staff and their engagement in the program:

It's a different energy level, happiness...sort of a joy and zest for life...a lot of that's led by the staff, because if you don't have staff that are happy to be here and excited that "wow, look at that snake", then the kids won't have that either... So most of the staff has early childhood or at least elementary ed. and then a couple that are more biology, environmental education... We're really fortunate to have staff that is really engaged... I think one that's hard is the interest in being outside, that's separate from work, you know. With all of our different environmental educators, you're excited about it here in doing that, but then are you still building your own interest and passion for it? (Roberta)

Sally's teachers have little training and most do not have college degrees, "Our staff training is very minimal here. I have had such wonderful teachers. They just do it on their own or they watch me and take back seat for a little bit and pick up on it."

Finding 13. *Lack of written curriculum, in many of the programs, impacts the ability to pass on the curriculum to future teachers and emphasizes the need of the*

preschool staff to be highly educated, life-long learners, capable of creating DAP curriculum in the natural world. See Appendix G for more details.

Over half of the nature preschools do not have a written curriculum. Many have units and themes that they do from year to year (some with a two year schedule), but the details are not always articulated in writing. The parent cooperative director and lead teacher expressed the consequences of not having a written curriculum:

New three-day teachers that are trying to fill Brenda's shoes and it's interesting because she's got this whole program... It's hard to pass on, OK, this is a cool little art project, but why are you doing it... That should be written down somewhere. What's a good skill that you're developing here? What are you talking through to the kids while they're doing it? That's a lot of what's missing. (Lisa)

So it's been kind of a new experience for us 'cause before it was three of us that had done it for years... So it's been kind of hard to have new people, but I meet with them, well we met with them in the summer and talked about in general how the year goes and the goals and then what we'd like to do, but then at the beginning of each unit I sit down with them... Because I don't have anything written down...it makes it easy to take their ideas. (Brenda)

Pat's description of written material is similar to some of the other programs:

It's a nature-based curriculum... We don't have a set written curriculum that everybody has to do the same time every year. It's totally up to the teachers to set their curriculum. So it's not laid in stone what they have to

do or when they have to do it... About eight years ago, I developed a nature center curriculum book, a three-ring binder. Now I didn't come up with every activity. I did a lot of Xeroxing from some of our best curriculum books that we all use in nature, but I did sections where we went through the seasons and we went through the overall themes that are offered that we usually use. I guess that some people use that more than others.

Research Question Seven

What can be learned about teaching and learning from nature center based preschool programs?

Finding 14. *Nature center based preschools have a unique approach to teaching and learning, specifically immersing children in the natural world that is inquiry based, child-centered, and sensory filled. Nature preschools share a desire to share this approach with traditional preschools, especially after receiving feedback on how well the children that attended their nature preschool are doing in kindergarten. There is also a desire to connect with other nature preschools to share approaches. (See Appendix H for more details.)*

Dissemination goal. Most of the nature preschool directors (six) discussed the need to share their programs with other preschools, in particular, helping traditional preschools provide the same type of outdoor experiences that nature preschools provide for their children. One of the directors was particularly outspoken on this issue. Another director spoke about how sharing the program with others is beneficial to both the participants and the nature preschool staff. These comments follow:

I think this can happen anywhere... As nature based preschools, I think we need to be better about helping traditional preschools do what we do...

There are ways to make traditional preschool play areas more natural, too... So I would rather have all of us as nature based preschools have the attitude of this should be happening everywhere. We shouldn't be such a novelty, like we are... How do we help other preschools do this kind of thing themselves, whether it's here in our community or even sort of within the region? ... And I would love to have sort of a preschool teacher institute... Have teachers come for three days and look at what kinds of activities can they do, how can they enhance their play areas, how can they enhance their indoor spaces and make them work nature based and then also give them some basic natural history... If Reggio can do institutes, why can't we? (Roberta)

I was part of a teacher training again for Haifa, Israel, because they're interested in incorporating nature into their curriculum... It adds a nice dimension to the job for all of us...to have the overarching opportunities... I think it enriches all of us... One of the things that we're working on is creating track boxes, curriculum boxes in general. We did create one box, a track box, with Internet resources, crafts and materials... So we're working on accumulating children's books around the various themes... We're trying to develop binders and boxes of materials. (Lori)

Kindergarten success. Many of the nature preschool directors have heard feedback from parents and kindergarten teachers on how the children from the nature

preschool are doing after they begin to attend the local schools. Some were too new to have feedback yet. Liz shared the kindergarten teacher's comments regarding the children that come from the nature preschool, "They say they're really knowledgeable about science and really into it, into nature and know a lot." Two other comments follow:

I know that they are going into kindergarten, ready. We have heard that from every kindergarten teacher as long as I've been there... They know how to hold scissors, they know how to sit down and listen to the beginning and middle and end of a story. They know how to express themselves... They've developed all of the basic developmental domains, the cognitive, the emotional, the social, creative as well as intellectual. They're ready for kindergarten and they go in and they do well in kindergarten. (Pat)

I've heard this from both parents and teachers that the children who have gone through this program are good at thinking and asking questions. I think that's that sort of critical thinking and teaching them to figure out things is something that people have noticed, "Well I always know the [nature preschool] students 'cause they know how to ask a question."... With the preschool, it's like the kids get so excited with anything they find at home, they're constantly bringing in treasures that they find and they really appreciate, everything. They're just so much more observant and trying to look at everything in a different way. (Brenda)

Diane reported that the children have different expectations of their kindergarten based on being at a nature preschool, "But children once they leave here and then they go

to other schools, like the first thing they do when they come home is say, ‘We didn’t get to go outside’... One parent, the child came home and said, ‘I’m going to quit because we didn’t go outside’.”

Network of nature preschools. Many of the nature preschool directors (five) would like to have a larger network of nature preschools to connect with, but Roberta and Ellen were most verbal about this desire. They commented on the fact that staff at a nature preschool feel isolated without a network to connect to:

I think the most important thing that I would love...is to really get developed is a network, you know, ‘cause sometimes we just feel kind of like we’re creating our own in this little bubble...and no one else on earth understands... You’re adapting this and adapting that, and you know, there’s 20 or so other centers out here that are doing very similar programs and, you know, the trading of ideas in education. (Ellen)

Environmental ed doesn’t quite get there and early childhood conferences don’t quite get there and, you know, we just have to create it ourselves... The theme running through it all is just the interest and the desire to get people outside, to care about being outside... It brings value beyond just caring about nature. That’s really important to me, but also that it just makes us happier, more complete people, healthier people. (Roberta)

Summary

This chapter presented the findings explored by this study, organized by the research questions. Data from individual interviews, observations, and documents of

nature center based preschools revealed research participants' perceptions of how nature preschools operate. In particular, they described the goals of their programs, how they integrate early childhood and environmental education in their daily practice, the role of the nature center, the role of the director, the teaching staff experience and training, curriculum approaches, and other influences that inform and impact the program (e.g., physical space, parent expectations, outdoor time, and research). Extensive samples of quotations from the participants were included to support the findings in this chapter.

The key findings suggest that the combination of early childhood and environmental education is more powerful together than each by itself. Participants offered examples of high quality practices in how access to nature, nature center resources and a nature-focused curriculum provides opportunities for children to develop early childhood skills of self-regulation, empathy, confidence, and cooperation, while developing an environmental ethic, through environmental learning and literacy, and fostering a sense of place. A nature focus also allows the curriculum to be emergent, child-directed, and academically integrated, promoting in-depth investigations based on authentic experiences. However, high quality practices of early childhood education and/or environmental education were not observed in all programs, especially due to a lack of education and training, by the teaching staff, in each of these areas. The dual goals of early childhood education and environmental education are present in almost all of the nature preschools. Programs are informed or impacted by the background and training of the director and teachers, indoor and outdoor physical space, nature center mission, resources and policies, parent expectations, and philosophy of education. Nature preschools have much to offer to the field of teaching and learning, and many of the

nature preschools would like to share their approaches with other preschools and the general public.

CHAPTER 5 CONCLUSIONS and RECOMMENDATIONS

Introduction

The purpose of this multiple case study, was to explore with a sample of nature center based preschool directors, how they integrate early childhood and environmental education goals in teaching young children. I was hopeful, that through in-depth interviews, class observations, and review of nature preschool documents, the practices and activities employed by these barely studied nature preschools would be illuminated, offering common ideas and high quality practices.

Eight nature center based preschool directors took part in the study. Teachers at some of the sites, and a nature center director at one of the sites, also provided information, thus adding diverse perspectives that contributed to the research data. This study was based on the following research questions:

1. In what ways do nature center based preschools integrate child development and environmental goals in teaching young children?
2. What do high quality practices in nature center based preschools look like, and are they consistent across programs?
3. How do directors in nature center based preschools incorporate elements of quality practice in their programs?
4. What goals do directors of nature center based preschools have for their program and curriculum, and how do these inform the environment and experiences they provide for the children?

5. What informs the program and curriculum (e.g., preschool methodology, environmental education, mission of the nature center, theories of child development, and director's background)?
6. What impacts the program and curriculum (e.g., parent expectations, kindergarten readiness, teacher qualifications and experience, nature center policies and expectations, and physical space)?
7. What can be learned about teaching and learning from nature center based preschool programs?

The findings that were attributed to each research question are illustrated in Chapter 4. The key finding in this study suggests that the combination of early childhood education and environmental education is more powerful together than each by itself. The integration of early childhood environmental education provides opportunities for children, in nature center based preschools, to meet early childhood development goals in all domains, while developing an environmental ethic. However, practices were inconsistent among the nature center based preschools, depending on the education background and level of training of the directors and teaching staff. Philosophy of education, director background, and nature center resources helped to inform the preschool programs. Physical space, parent expectations, and teaching staff background and training had an impact on the programs. Many of the preschool directors felt a need to share the nature-focused approach to early childhood education with educators at traditional preschools.

The first part of this chapter interprets the findings and is organized by the following analytic categories:

1. Methods used to integrate early childhood education and environmental education within the nature center based preschool programs. (Research Question 1)
2. Identification, application, and consistency of high quality practices among programs. (Research Questions 2 and 3)
3. Comparison of program goals among nature center based preschools. (Research Question 4)
4. The role of the director, nature center, curriculum approaches, physical space, parent expectations, and teaching staff for informing or impacting the nature center based preschool programs. (Research Questions 5 and 6)
5. The role of the nature center based preschool approach in the larger educational community. (Research Question 7)

These analytic categories are aligned with the research questions. In the following analysis, using the findings presented in the previous chapter, I searched for connecting patterns within each analytic category, as well as any other themes that emerged among the various categories. In a secondary level of analysis, I tied in the relevant research, where applicable.

In chapter 4, the findings of the study were taken from various sources, organized into categories, resulting in a readable narrative. The purpose of the analysis in this chapter is to provide interpretative insights into these findings, in an attempt at providing a more holistic understanding and integrated view. Throughout this process, the analysis was framed by the participants' responses, their understanding of the workings of nature preschools, and consistency and inconsistency with the literature. The discussion takes into account the literature on the benefits of nature for young children, high quality

practices in both early childhood and environmental education, and guidelines for excellence in early childhood environmental education. The implications of these findings are intended to inform the field of early childhood environmental education, particularly nature center based preschools, hopefully raising the level of quality and consistency of practice across programs. This section concludes with a reexamination of my original assumptions from Chapter 1 and a summary that includes a note about the potential for researcher bias. The second part of this chapter presents the conclusions and recommendations for this study.

Analytic Category 1: Methods Used to Integrate Early Childhood Education and Environmental Education Within the Nature Preschool Programs

The key finding of this study is that the combination of early childhood education and environmental education is more powerful together than each by itself. Resembling gestalt theory, where the whole is greater than the sum of its parts, this combination is an integration of disciplines, not an addition of one to the other. The following discussion centers on this integration.

Effective early childhood education provides opportunities for children to develop in all domains of early childhood (Copple & Bredekamp, 2009). This includes social, emotional, cognitive, physical, and spiritual development. Although primarily based on serving the needs of the developing child, throughout history many approaches have included study of the natural world as a part of their programs. Effective environmental education, and more recently, education for sustainability, provides opportunities for children to learn *about* the environment, immerse themselves *in* the natural world, and

become active *for* the environment. The primary focus of environmental education is to change behavior regarding the environment. To include environmental sensitivity as a necessary component, quality environmental education programs took on perspectives of early childhood education, such as a child-centered approach that is experienced-based and involves children learning through their senses. Each discipline, by itself, serves to meet their individual goals for child development or environmental stewardship.

However, together they can meet both goals more successfully, in an integrated approach that addresses the whole child. Nature provides opportunities for authentic experiences for children's growth, especially for learning through the senses. And early childhood education provides a child-centered approach that promotes in-depth investigations and an emergent curriculum. These common threads weave through both disciplines (Davis, 1998).

A fundamental part of this analysis is to better understand how nature preschools provide direct experiences with nature for young children. Stephen Kellert (2005) asserts that, "Direct, ongoing experience of nature in relatively familiar settings remains a vital source for children's physical, emotional, and intellectual development" (p. 81). The findings described in the previous chapter provided examples of how nature experiences help to develop self-regulation skills, cooperative play, and allow children to take appropriate risks, helping to promote independence and physical development. Self-regulation skills are naturally learned when children want to see wildlife and figure out that being quiet while outside facilitates this activity. Providing reasons for why these behaviors are important (attaching a value to the behavior) also supports self-regulation skill development.

Opportunities for appropriate risk taking in natural play areas promoted physical development and the ability to feel confident and safe while outside. In order to provide opportunities for direct contact with nature for young children, they need to feel safe and protected. Kellert (2005) suggests that young children, under the age of six, focus on developing the biophilic values most related to, “physical and material security and the avoidance of threat and danger” (p. 76). Nature center based preschools give children the opportunity to spend time in the natural world in a safe and secure way, where they begin to feel comfortable, can assess risk, and achieve a sense of independence and self-confidence. This allows them to focus on exploration and discovery, curiosity and imagination, caring for others, critical thinking and problem solving, and treating the world with kindness and respect.

Opportunities for cooperative play were plentiful, especially in natural areas where the children were allowed to participate in nature play. In addition to cooperation, other socialization skills, like sharing and solving problems between children, were prevalent in these areas. According to Kellert (2005), “The direct experience of nature also extends to the child the possibilities of uncertainty, risk, and failure. These realities necessitate adaptation and problem solving as well as the need to construct solutions and to think critically, all of which are essential to lasting learning and maturation” (Kellert, 2005, p. 86).

The integration of early childhood and environmental education was facilitated through the nature center resources available to each of the nature preschools. Because of these resources, children were able to develop empathy, build confidence and dissolve fears, foster a sense of place, and act with an environmental ethic. Empathy is developed

through interaction and care of animals found in most of the nature preschool programs, often as resources that the nature center supplies. Kellert (2005) explains how nature, “especially...other animals provides an emotionally powerful...basis for affective development” (p. 71). He continues:

A child responds to stimuli with such basic emotional states as like, dislike, attraction, aversion, doubt, joy, sorrow, fear, wonder, and more...
For example, young people encounter in nature various creatures that look, move, and feel like themselves. These resemblances prompt children to respond emotionally, most importantly by extending to these creatures the presumed capacities to feel and to think, which produces an emotional bond and assumption of reciprocity. (p. 71)

The opportunities for children to be in contact with animals at each of the nature preschools varied, from collecting and caring for local animals to hatching chicks in the classroom. In one program the children participated in farm chores, where they fed and cared for farm animals. This also enabled the children to overcome fears and develop confidence in their newly acquired skills. Children are dealing with emotional issues when they first come to preschool, such as separation from their mothers, but those emotions can carry over to the natural world. Caring for animals can help them find an emotional connection to their new preschool world that may help them. Other resources that the nature centers provided, that helped the children build confidence and dissolve fears, included diverse habitats and natural play areas.

These habitats also provided opportunities for the children to explore, fostering a sense of place, and providing direct experiences with the natural world. In the following

quote, Kellert (2005) describes what constitutes direct experience with nature:

Direct experience of nature is often spontaneous and unplanned, occurring in relatively unmanaged areas, such as a meadow, a creek, a forest or sometimes even a park or a child's backyard. Ecologist Robert Pyle describes these settings as places where "kids...[are] free to climb trees, muck about, catch things, and get wet". (p. 65)

The habitats that nature centers provide for their nature preschools, and nature play in these areas, provide direct experience with nature for young children. A sense of place is developed through daily exposure to these natural spaces and also through a sense of ownership. Nature preschools enable children to develop a sense of place when they provide repeat visits to special places over the course of the year, take an in-depth look at the surrounding flora and fauna (including naming them), immerse children in the natural world through their senses, find delight and surprise in common and familiar settings, learn and tell the stories related to the nature center habitats and natural play spaces. This sense of place leads to action because love of a place leads to taking responsibility for its well-being.

Exploring nature center habitats provided opportunities for the children to act with an environmental ethic. As one teacher put it "awareness of nature is empowering" (Brenda). Julie Davis (2010) suggests that education for the environment and for sustainability in early childhood education is transformative. Nature centers often can provide those opportunities because of their mission, staff expertise in areas beyond early childhood education, teaching animals, and their many acres of diverse habitats.

Analytic Category 2: Identification, Application, and Consistency of High Quality Practices

This analytic category looks at high quality practices that were identified by the nature preschool directors and through my observations of the nature preschool classes. It also includes how these practices were applied in each preschool, and how consistent these were across the programs. The basis for understanding what high quality practices should look like come from the *Early Childhood Environmental Education: Guidelines for Excellence* (NAAEE, 2010) that incorporates developmentally appropriate practices in early childhood education, as well as, quality practices in environmental education.

The findings suggest that the natural world provides opportunities for the curriculum to follow developmentally appropriate practices and that the diverse habitats of the nature centers provide opportunities for environmental learning and literacy that follow quality practices of environmental education. The background and experience of the teaching staff are an integral part of providing high quality practices. There appeared to be some variation among the programs, where most, but not all, seemed to adhere to high standards of early childhood environmental education. The application of high quality practices in early childhood environmental education included in depth investigations, intentional teaching practices, a variety of curriculum approaches, and making the outdoors a priority.

The *Early Childhood Environmental Education Programs: Guidelines for Excellence* (ECEE guidelines) incorporate high quality practices of early childhood education and environmental education (as outlined on Table 2.1 in Chapter 2). Inherent

in these guidelines is the whole child, child directed and inquiry based teaching approaches, authentic experiences, and natural materials:

Because the natural and built environments offer such a large variety of sensory experiences for young children, the framework for these practices allows the educator to support the learning style of each individual child through their senses in all areas of development – social-emotional, cognitive, and physical. When children are able to explore their environment, interact with it, and communicate about it at their own developmental level, the educator can support and extend this learning by engaging in inquiry with the children. (NAAEE, 2010, p. 19)

The findings indicate that because the nature preschools rely on the natural world for their topics, the curricula are based on authentic experiences and there are opportunities for them to be emergent, child-centered, and academically integrated. All of the examples from the nature preschools of emergent curricula were based on outside experiences. The natural world is constantly changing offering anticipation and surprise on a daily basis. When open to the possibilities that nature can bestow, the curriculum can emerge and be based on what children find on their outdoor excursions. The ECEE guidelines state that, “The developmentally appropriate program responds to children’s needs to explore, discover, and discuss their experiences in the environment” (NAAEE, 2010, p. 20). There were numerous examples of authentic experiences when children were given the opportunity to explore the natural world on a daily basis.

The opportunity for child directed activities seemed to increase when natural materials were involved. Even those programs that were more teacher-directed seemed

more child-directed when nature was involved. And when the program is planned with the whole child in mind, the curriculum is integrated, not focusing on academics, rather allowing them to happen through meaningful experiences in the natural world or as one of the preschool directors put it “in the context of reality” (Pat). Stephen Kellert (2005) described how children’s cognitive development is greatly enhanced through contact with the natural world.

The major task of the first stage of cognitive development is forming basic understanding of facts and terms, creating rudimentary classifications, and crudely discerning causal relationships. The natural world greatly aids this emerging capacity because it affords numerous highly stimulating and engaging opportunities to identify and order basic information and ideas (p. 69).

Although all of the nature preschools found ways to provide an integrated curriculum, six of the programs made nature the main focus and academics were integrated secondarily. When academics were the main focus, nature themes were used to enhance the approach.

All of the nature centers had resources that included multiple acres of diverse habitats that the preschoolers were able to explore. And because the preschools were nine-month programs that children attended multiple times per week, it allowed the curriculum to be set up to follow the seasons, enabling them to concentrate on environmental concepts that could be found outside throughout the year. The children revisited places over again in different seasons providing opportunities to increase their environmental literacy.

The nature center habitats also provided plenty of opportunities for child-initiated nature play. All of the nature preschools had natural areas that were either fenced in just outside their building; nearby areas with natural boundaries, or areas of the nature center grounds where they could stop and play. The ECEE guidelines suggest that, “Early childhood environmental education programs provide places and spaces...that are safe, enticing, comfortable, and enhance learning and development across all learning domains... Young children build their knowledge of self and other people around them through active participation and experience...including play and exploration in the outdoors (NAAEE, 2010, p. 31, 45). These natural play spaces are essential for allowing children to explore, build theories, ask questions, and develop skills for understanding the environment. Critical skills are suggested by the ECEE guidelines, “Young children increasingly develop their ability to investigate, analyze, and respond to environmental changes, situations, and concerns” (NAAEE, 2010, p. 37).

As a logical outcome, time spent in the natural world also encouraged problem solving as the children explored the different habitats and were given time to figure things out. The ECEE guidelines state that, “Young children learn about their environment in a mixture of ways. Much of this learning takes place through direct experiences, exploration, and discovery...with opportunities to develop curiosity, ask their own questions, and begin to develop reasoning and problem-solving skills” (NAAEE, 2010, p. 32). Problem solving occurs through inquiry-based science and setting up experiments, but the natural world offers the subject and catalyst to get those young brains thinking. The teachers play a role in facilitating this problem solving.

Teachers that really understand the combination of nature and child development are critical for providing an excellent program. The ECEE guidelines suggest that educator preparation include both early childhood and environmental education foundations:

Early childhood environmental educators combine their understanding of child development and developmentally appropriate practice with a basic understanding of the goals, theory, practice, and history of the field of environmental education. This knowledge provides a solid foundation on which educators can build their own practice. (NAAEE, 2010, p. 53)

As with all preschool programs, nature preschools can only rise to the level of excellence afforded by the teachers. And as Roberta expressed it, “hiring the right staff...people who understand it...at their core” is the key to having an excellent program. These include curious, creative, life-long learners who, at best, have a background in early childhood and environmental education, or at least, are willing to learn what they do not know.

High quality practices of early childhood and environmental education articulated by the ECEE guidelines of excellence were integral parts of most of the nature preschools I observed. However, some of the programs did not consistently follow these practices. Just because preschools are housed at a nature center and have superior resources at their disposal, does not guarantee that they follow quality practices of early childhood education or environmental education. One reason might be a lack of knowledge of what these practices are in one or both disciplines, possibly because of the education background of the director and/or teachers.

All of these examples point to the need for a good background in early childhood education that many of the preschool directors said was important. Having a background and interest in the natural world is also important to instill a love of nature in the children they teach. Use of the nature center resources, particularly available naturalists, was also inconsistent. In some programs the naturalists were regular visitors to the preschool. In others, they were less frequent and visited on a hit-or-miss basis. Again their value seemed to be linked to the education background of the director/teacher rather than seen as a valuable addition that gave the needed expertise to the program. It may also have been a product of the budget constraints of the nature center. Nature center naturalists need to be a dedicated part of the nature preschool program and should be a planned part of the program from the very start.

In understanding how high quality practices were incorporated in each of the nature preschools, I looked at the practices inherent in a nature preschool, outcomes associated with these practices, and then identified the approach being used. (Each of these categories is listed and described in more detail in Appendix I.) Nature play and hiking in the natural world, farm chores, wildlife visits, and nature center collections (artifacts) enhanced the ability of the preschools to initiate projects. Lillian Katz and Judy Harris Helm (2011) are proponents of the project approach in early childhood education. Katz (1994) explains the project approach as follows:

A project is an in-depth investigation of a topic worth learning more about. The investigation is usually undertaken by a small group of children within a class, sometimes by a whole class, and occasionally by an individual child. The key feature of a project is that it is a research effort

deliberately focused on finding answers to questions about a topic posed either by the children, the teacher, or the teacher working with the children (p. 1).

The natural world provided the subject matter and opportunity for these in-depth investigations to occur, resulting in many projects that were initiated by the children or teachers, in small groups, large groups, or by individual children. All of these projects were precipitated by exposure to the natural world.

Nature center resources, safety, and the priority on being outside precipitated several intentional teaching methods used in many of the nature preschools. Carol Copple and Sue Bredekamp (2009) explain how effective teaching is intentional:

Effective teaching does not happen by chance. A hallmark of developmentally appropriate teaching is intentionality. Good teachers are intentional in everything they do – setting up the classroom, planning curriculum, making use of various teaching strategies, assessing children, interacting with them, and working with their families. Intentional teachers are purposeful and thoughtful about the actions they take, and they direct their teaching toward the goals the program is trying to help children reach. (p. 10)

Most of the intentional teaching approaches used by the nature preschools had some connection to the nature focus of the program, even though the preschool directors did not always concur. The nature center resources, specifically the collections or artifacts, were a large part of the program for one of the preschools. These were used for the study units that made up the curriculum. The need to be safe, while outside hiking on the trails,

informed some of the intentional teaching approaches, including the Nurtured Heart approach to discipline, puppets, sense of community, and the Montessori method. Although not mentioned as such by some of the preschool directors, each of these methods helped the children with safety outdoors. The Nurtured Heart approach to discipline helped them be more aware of how their behavior affected the class. Puppets were used to explain certain safety issues in a more enjoyable way so that the children paid attention. Developing a sense of community was specifically used to help the children be safer and look out for each other. And the Montessori method helped children be more independent and self-sufficient, thus safer when outside.

Hiking in diverse habitats, nature play, exposure to animals and plants, and natural materials in the art area initiated open-ended art based on authentic experiences in many of the programs. Developmentally appropriate practice in the visual arts states that, “Teachers give children opportunities to explore various art materials (e.g., markers, paints, clay) to use in creative expression and representation... Teachers do not provide a model that they expect children to copy” (Copple & Bredekamp, 2009, p. 176). In contrast, in a program that is not developmentally appropriate, “Teachers provide only a very limited selection of art materials... Emphasis is on the products children make and teachers typically provide a model that children are to reproduce... They often give children tasks such as coloring in forms on printed pages” (Copple & Bredekamp, 2009, p. 176). Although nature provides the resources for encouraging open-ended art, not all programs were familiar with the concept of open-ended art. Naturalists at nature centers tend to be product focused, providing models for children to copy, hoping that the art project will convey the environmental concept inherent in the project.

Seasonal themes, nature play and hiking in the natural world, nature center collections, and nature activities all contributed to providing an integrated curriculum. Several of the preschool directors felt that meaningful experiences that are a part of the children's daily lives were more important for learning knowledge and skills. Although several of the preschools used different curriculum approaches, all of the nature preschools used the natural world as their foundation and integrated other subjects into that framework.

Animals in the classroom, finding animals outside, and nature center resources including teaching animals, farm animals, and wildlife visits all contributed to engagement with animals. However, the number and variety of local animals, and the opportunity afforded by the nature centers, varied from site to site.

An intentional teaching approach, that two of the nature preschools used, was to start their class time outside. The other six programs started inside first, and went outside later during their class time, often at the end of the day. Although the order that the classes go outside should not preclude spending more or less time outside, it did seem to have an effect on the amount of time the children spent outside. My observations, although limited, did reveal that those programs that started outside spent more time outside than those that started inside. I spent only one day at each site, not enough time to make a clear determination that programs starting outside put a higher priority on being outside, than the other programs. However, from my own experience, teaching and directing at a nature preschool, I realized that starting outside *does* put a priority on spending time outside. It says to the children that being outside is important and it says to the parents, dress your children for the weather because we always go outside first. I also

discovered that we spent more time outside when we started there, whereas starting inside made it more difficult to go outside in a timely fashion, partly due to the limited time of the class (2-3/4 hrs.). By intentionally starting outside, a conscious priority is placed on being outside that is modeled for the children. Fostering a sense of place in the natural world, requires that time be spent there. Child-initiated nature play in natural play areas enables children to know a place deeply, as do the nature center grounds that become a living laboratory. Starting their day in one of those play areas increases the possibility for fostering a sense of place.

Analytic Category 3:

Comparison of Program Goals Among Nature Preschools

All of the nature preschool directors provided early childhood goals for their programs. All but one program director verbalized their environmental education goals, as well. Out of those seven preschools, six refer to both goals in their preschool handbooks or brochures. These goal statements are listed in Appendix E. These dual goals include meeting the developmental needs of young children and cultivating an environmental ethic. The programs that stated both goals seemed to be more in tune with their nature center's mission, as well, often using that mission as the preschool's overarching goal. The program that did not mention an environmental goal was more loosely connected with the environmental education center near its site and, although operating under their regulations, the preschool was not operated by the nature center.

Essentially, the environmental education goals state that children need to develop a love and respect for nature so they will grow up to take responsibility for protecting the

natural world. Through a concept known as the Biophilia Hypotheses, children are inherently predetermined to engage in nature and the natural world (Kellert & Wilson, 1993). E.O. Wilson (1984) defined the concept of biophilia as, “The innate tendency to focus on life and lifelike processes” (p. 1). He suggests that:

Our existence depends on this propensity, our spirit is woven from it, hope rises on its currents... To the degree that we come to understand other organisms, we will place a greater value on them, and on ourselves... Humanity is exalted not because we are so far above other living creatures, but because knowing them well elevates the very concept of life. (p. 1-2, 22)

Even though biophilia is innate, unless young children are given the opportunity to have consistent, positive experiences in the natural world, biophilia will not take hold, thus reducing the chance that children will develop an environmental ethic (Orr, 1994).

Number five on the list of principles of child development that inform developmentally appropriate practice states, “Early experiences have profound effects, both cumulative and delayed, on a child’s development and learning; and optimal periods exist for certain types of development and learning to occur” (Copple and Bredekamp, 2009, p.12). The preschool years are optimal times for children to develop empathy and a love and respect for nature. Nature preschools have shown that environmental goals go hand in hand with early childhood goals, especially socialization skills, which seem to be the primary early childhood goal of most of the nature preschools. To adopt *both/and* thinking as suggested by Copple and Bredekamp (2009), nature preschool goals need to address *both* the

developmental needs of young children *and* their biophilic tendency to focus on the natural world.

Analytic Category 4: Role of the Director, Nature Center, Curriculum, Space, Parents, and Teaching Staff

There were several aspects of the preschools that seemed to inform or impact the programs. These included the role of the director, role of the nature center, curriculum approaches, physical space, parent expectations, and teaching background and training. Ideas concerning each aspect are discussed in the following paragraphs.

Role of the Director

The role of the nature preschool director seemed to be important for informing the preschool curriculum and structure. In all the nature preschools, quality practices and the content depth and breadth of the program were related to some degree to the background, training, and character traits of the nature preschool directors. The nature preschool directors seemed to have autonomy in how they set up their preschools and had decision-making ability to hire staff. The degree to their complete control over the preschool varied, based on the organizational structure of the environmental education center with which they worked.

Several elements of the preschool directors' background and training were identified as possibly being significant for understanding the essence of a nature preschool, how it should operate, and being able to structure the program to achieve a high quality. Most of these programs were started before there were any quality standards for early childhood environmental education, and no quality standards exist for nature

preschools. Therefore, the ability of the nature preschool directors, in their educational training and knowledge of high quality practices in early childhood and environmental education, or their ability to learn what is important, become crucial for setting up a quality program. Thus, education and/or training in early childhood education and environmental education and being a life-long learner, become important skills and qualities for nature preschool directors. If education in one of the disciplines (early childhood education or environmental education) is lacking, partnering with a teacher that has that expertise also added to the quality of the program. Having the resources to hire excellent staff with this same background also improved the quality of the program.

One interesting observation was that over half of the nature preschool directors talked about how time spent in the natural world as children influenced them to start or direct a nature preschool. Significant life experience research suggests that adults that spent time in nature as a child have a greater possibility of working in an environmental field or, at least, have a greater environmental commitment than those who did not (Tanner, 1980; Chawla 1998; Wells & Lekies, 2006). Some of these directors, that started their nature preschool, felt a sense of ownership of the program, compelling them to have a more direct influence on its direction.

Role of the Nature Center

The mission and resources of the nature centers seemed to inform the preschool programs. However, this depended on the relationship between the nature center and the preschool. The policies and procedures, and the reporting structures at the nature centers often had an impact on the preschool programs.

Probably the most significant resource that all the nature centers offered, was their diverse habitats that ranged from between 40 acres to nearly 1200 acres. Young children do not need extensive acreage, per se, but diverse habitats that are within a reasonable reach. Robert Michael Pyle (1993) suggests that these wild places are important for young children:

It is through close and intimate contact with a particular patch of ground that we learn to respond to the earth, to see that it really matters...

Everybody has a ditch, or ought to. For only the ditches – and the fields, the woods, the ravines – can teach us to care enough for all the land... To gain the solace of nature, we must connect deeply (p. xviii-xix, 152).

The other resources that were particularly important for informing the preschool programs included the teaching animals (farm animals and wild animals), collections of artifacts, and naturalists. These resources provided the authentic experiences that are unique to nature preschools.

Several preschools started as a natural extension of existing early childhood programming that the nature centers already had in place. These preschools were a logical next step to meet the mission of the nature centers that usually centered on connecting people to the natural world. All of these nature center aspects served to inform the preschool curriculum and program. But the better the relationship (e.g., collective mission, proximity, shared staff, and communication among programs) between the preschool and nature center, the more the nature center resources were shared, and the more environmentally based the preschool appeared. Policies and procedures of the different nature centers sometimes had an impact on the preschool

program, in that they reduced the amount of control and decision making ability the preschool directors had on their program (e.g. budgets and staff salaries).

Curriculum Approaches

All of the preschool directors tended to subscribe to a particular philosophy of education that informed the curricula at the different nature preschools. These varied in approach and degree of influence on the program. Many of these philosophies/approaches were a direct result of the background, education, or training of the preschool directors and a lack of a standardized nature preschool approach. This also required the preschool directors to create their programs from scratch or as add on curricula to an existing approach. As such, most of the programs did not have a written curriculum. Relying on the natural world for subject and content means being flexible to incorporate whatever is available on a daily basis. Many of the preschool directors had an outline that they followed and themes or topics that they adhered to (sometimes on a two year schedule), but almost none of them had written down the details of their curricula. This left much of the planning and creating to the teachers, therefore requiring them to be creative, curious, and knowledgeable about the natural world. They also needed to be individuals that were willing to learn new things and research what they did not know. Unfortunately, many of the teachers did not have four-year college degrees and some did not have a background in either early childhood or environmental education. This points to the need for having sufficient resources available to hire and keep qualified staff, who have a background in both disciplines, including local knowledge of the natural environment in their preschool's region.

Physical Space

The physical space where the nature preschools hold their classes include inside and outside spaces that are provided by the nature centers. Most of the programs are in renovated spaces including a maintenance building, houses, barns, and a garage. Only one of the programs I visited had a new preschool building. And one of the programs used a multi-use space not designed as a preschool class. Some, but not all, of the renovated spaces were lovely preschool classrooms that incorporated the natural world in different ways. Although the physical space did impact the programs, the creativeness of the preschool director and teachers made up for some of the space limitations.

The schedule and flow of the day was impacted by several limitations of the indoor physical space. For example, the number, size, and location (distance from the preschool classroom) of the bathrooms affected six of the programs. Although most of the programs had doors that went directly outside from their classrooms, few used this as a way to have children inside and outside during free choice time (because in some cases there was no fenced in outdoor area). And some programs shared their classrooms with other preschool classes on other days. The outdoor spaces also impacted the use of the outdoors. Those programs that had nearby natural play areas seemed to encourage more nature play than those that did not, because the areas were readily available and often fenced in or having natural boundaries. But if the teachers intentionally made nature play a priority they would take the children to places on the nature center grounds where they could build structures with loose parts and play. However, this depended on the preschool staff and might not happen as readily.

Parent Expectations

Although most of the preschool directors indicated that the parents that send their children to their nature preschool were pretty much in line with the outdoor focus, and did not expect that the children would focus on academics, they did want the children to be ready for kindergarten. Many of the preschool directors felt that it was important to educate parents about the benefits of the nature-based curriculum, and how it does prepare children for kindergarten, but not in the traditional sense. One preschool director described this, “We have to emphasize to parents that this is really a natural science curriculum and that in order to make writing meaningful, to make reading meaningful, and math meaningful, it helps to have experiences where you can actually apply those concepts” (Lori). Another preschool director said that they bring in a kindergarten teacher to a parent education program to talk about what kindergarten teachers are actually expecting, dispelling the need for a focus on academics. One of the programs was impacted by the parent expectations regarding kindergarten readiness and academics. In response to parent pressures, they added a class for four year olds with a focus on academics through nature themes. This was the only program that seemed to succumb to these pressures. Other programs felt more strongly that this was an inappropriate method of teaching and turned to parent education instead.

Teaching Background and Training

Nature preschools have no set of quality standards or guidelines that suggest what the education or background training should be for their teaching staff. All are held accountable by the licensing requirements of the state where they are located. Most state regulations do not require a four-year college degree for teaching preschool, let alone

background knowledge of environmental education. Nature centers often take advantage of this fact and may hire one teacher with a college degree in either early childhood or environmental education (as the head teacher or maybe the director that teaches), but the assistant teachers may not be as educated. Budget usually determines the quality of the staff that can be hired. However, three of the nature preschools I visited have teachers with four-year degrees in either early childhood or environmental education (combining disciplines in the classroom). The quality of the programs I visited seemed higher in these three nature preschools. There appeared to be a better understanding of developmentally appropriate practices and child development, as well as good environmental education in these three programs, as compared to the other programs. This did not preclude the other preschools from having quality programs, but a higher level of education, and a combination of early childhood and environmental education backgrounds, seemed to be the common denominator in the programs that revealed consistent quality and purpose.

Analytic Category 5: The Role of the Nature Preschool

Approach in the Larger Educational Community.

The nature center based preschools may have a lot to offer traditional preschool programs. Research continues to show the benefits of nature for young children, such as, increasing their physical development (Fjortoft, 2001), improving symptoms of ADHD (Faber Taylor & Kuo, 2006, 2009, 2011; Kuo & Faber Taylor, 2004), decreasing violence and aggression (Kuo & Sullivan, 2001a, 2001b), reducing stress (Wells & Evans, 2003), increasing creative play (Faber Taylor, Wiley, Kuo, & Sullivan, 1998), promoting brain development (Jensen, 2008; Medina, 2008), and developing an environmental ethic

(Chawla, 1998; Tanner, 1980). In addition, this unique nature based approach to early childhood education promotes inquiry, exploration, and child initiated play.

Many of the nature preschool directors felt a need to share their programs. At least six of the directors have provided some type of workshop or trunks for teachers interested in learning about providing more nature in their own preschools. The majority of nature preschools were interested in sharing their methods, particularly because they saw the results of their programs in the children that went on to kindergarten; curious, questioning, confident children that kindergarten teachers recognized as having been part of a unique preschool. When I visited one of the nature preschool programs, I observed several skills and behaviors that the children elicited including good observation skills and listening skills, environmental awareness, cooperation between children working together outside, a willingness to share discoveries, children's knowledge of safety rules, enthusiasm, joy, fun, comfort and ease outside.

Many of the nature preschool directors and teachers tried to be part of preschool groups in their communities, but often felt isolated because their approach was so different. They spoke about the need to find other nature preschools with which they could network, such as a group or association of nature preschools, including conferences where they could share their approaches and learn from other nature preschool teachers who face the same unique challenges.

Revisiting Assumptions from Chapter 1

It is useful to revisit the five assumptions stated in Chapter 1. These assumptions were a result of my background and experience as a nature preschool director and early

childhood environmental education teacher for more than twenty years. The following discussion reviews these assumptions in light of the analysis of this study's findings.

My first assumption underlying the research was that nature centers that operate or are connected with a nature preschool offer resources that most other preschools lack including diverse habitats, access to wild animals, and experienced naturalists. This assumption held true, however, the access to these resources varied based on the relationship the preschool had with the nature center and the education/experience of the teaching staff willing to use these resources.

My second assumption was that programs that start their day outside intentionally make spending time outside a priority of the program. This assumption turned out to be partially true. Although the programs that started outside seemed to make it a priority by spending more time outside on the days I observed, comments from some of the preschool directors indicated otherwise. Further observations and research is warranted on this point.

My third assumption was that in order to teach at a nature preschool, teachers need a background in early childhood education and environmental education or both disciplines need to be present in each class. This assumption held true, in that, programs that had well educated teachers with both disciplines present in the class, seemed to provide a better experience for the children. Using the *Early Childhood Environmental Education: Guidelines for Excellence*, observations of the nature preschool practices bore out this point. However, without quality standards specifically for nature-based preschools, this assumption also relied on my expertise in the field of inquiry.

The fourth assumption was that the background of the preschool director is critical for implementing a quality program. This assumption also held true in that the nature preschool director is the primary person that drives the nature preschool and sets up the program, including the classroom environment, preschool curriculum, and hiring teachers. Nature center directors typically do not have the expertise in early childhood to know what needs to be done. They tend to rely on the preschool director to have the knowledge and background needed to create an excellent program. The background and experience of the nature preschool directors become extremely important to this process and informs the preschool program.

The fifth and final assumption was that space allocated to a nature preschool could affect the quality of the program. This assumption turned out to be partially true in that some aspects of the physical space do affect the program schedule and flow. However, the creativity of the preschool director and teaching staff can overcome some limitations in physical space.

Summary of Interpretation of Findings

The preceding section of this chapter portrayed the relevant experiences at nature center based preschools of a sample of nature preschool directors and teachers. In summary, the prior discussion illustrates the multiple influences that inform and impact this unique program. The discussion reveals the need for a deep understanding of the dual disciplines of early childhood education and environmental education, and their critical place in providing a program that meets quality standards that currently exist in each profession. It offers an explanation for creating new standards for nature center based

preschools suggesting that, as we combine early childhood and environmental education, a new level of quality emerges, requiring new standards be created to sustain an excellent program that meets the needs of the developing children and their biophilic tendencies.

The process of analyzing the findings was to take the large amount of data collected and reduce the volume of information into a holistic and integrated synthesis by identifying patterns and constructing a framework for communicating the essence of the data (Bloomberg & Volpe, 2008). Through the process of the cross case analysis, no important relationships were found regarding some of the factors surrounding the multiple variation of the participants, specifically the age of the preschool. The size of the preschool did not seem to matter, except when the program was larger (three classrooms) and the director did not teach, and therefore had less influence on the details of the program in each class. However, the background of the director and the expertise and education of the teaching staff were significant.

A degree of caution is warranted in regard to the analysis of these findings. First, the sample size was small, comprising interview data from only eight nature preschool directors, although input from a few teachers and a nature center director were included. Secondly, the number of sites was limited and may not represent all the conceivable approaches present at nature center based preschools.

The greatest strength of the qualitative research approach is the human factor, however, it is also its fundamental weakness. Recognizing that qualitative inquiry is subjective in nature, my expertise and experience in the field of inquiry provides both advantages and limitations. Advantages, in that my experience for the past 20 years, directing and teaching at a nature preschool and within the field of early childhood

environmental education, uniquely qualifies me to conduct this particular research. Limitations, in that my biases may have entered into the analysis of the findings in a way that another researcher might not have considered. Thus I have attempted to present and discuss these findings with professional colleagues in the field of early childhood environmental education and nature preschools, in particular, whenever the opportunity presented itself. I also critically reflected on the data through ongoing journaling throughout the study. Although the preceding section of this chapter is essentially my understandings of the data and how I made sense and meaning out of the material, I remain open to the possibility that others may see different connections and might have told a different story.

Conclusions

The following is a discussion of the major findings and conclusions for this study. The conclusions follow the research questions and the findings and therefore address the following areas: the integration of early childhood and environmental education goals, methods and quality practices for nature center based preschools; the role of the nature center, and the director and teaching staff background and training; and the role of nature center based preschool approaches for informing teaching and learning in traditional preschools. The discussion is followed by several recommendations and a final reflection on this study.

The first major finding is that the combination of early childhood education and environmental education is more powerful together than each by itself. Nature preschools have shown that environmental goals go hand in hand with early childhood goals. Nature

preschool goals address *both* the developmental needs of young children *and* their biophilic tendency to focus on the natural world. A conclusion to be drawn from this finding is combining the goals of early childhood education and environmental education enhances both disciplines, providing a unique experience for young children that truly address the whole child (cognitive, social, emotional, physical, aesthetic, spiritual, *and* environmental or biophilic). Direct contact with nature is essential for children to develop a sense of place and an ecological identity that becomes an environmental ethic. However, young children need to feel safe and secure first, before they are able to engage in direct contact with nature. Nature preschools provide this safe and secure environment where children develop social and emotional skills to overcome their fears and build confidence.

The second major finding is that nature center resources play an integral part in the nature preschool program. A conclusion to be drawn from this is that the relationship between the nature center and preschool is important for supplying the environmental education focus and for including the resources that are available. However, how they are used varies based on the education, background, and training of the preschool staff. At the present time, no guidelines of excellence exist for nature preschools, so staff is left to develop their programs within the confines of their experience and the nature center policies and procedures.

A third major finding is that the education, background and training of the director and preschool teaching staff have a direct effect on the quality of the preschool program. Higher quality programs had better educated staff that had a good understanding of excellent practices in early childhood education and environmental

education. The creativity of the preschool staff was a more important factor than the physical space allotted for the preschool. A conclusion to be drawn from this is education and training on quality practices for early childhood environmental education is essential for directors and teachers. Preschool staff should be required to have, at the minimum, a good background (i.e., experience and/or college courses or degrees) in early childhood education and/or environmental education, in order to provide a better foundation for a nature preschool program. At the least, the preschool staff should have a balance of experience in these two disciplines represented. Well-educated staff is able to educate parents on the benefits of nature for young children, thus eliminating the inappropriate academic expectations that parents might have for the program.

A fourth major finding is that there are no quality standards for nature preschools. This extends to nature preschool curriculum. Nature center directors, who do not have experience in early childhood education or age-appropriate practices for early childhood environmental education, usually rely on the nature preschool director to put the program together and set the policies. Many of the directors have created their own nature-based curriculum and most are not written down. A conclusion to be drawn from this is that each nature preschool, although allied with the natural world, runs by a separate set of rules, policies, expectations, and practices closely aligned with the experience and background of the nature preschool director. When the director has experience with quality practices in early childhood and environmental education, the preschool program is of high quality. If the director's experience is limited, the program suffers and, although there are early childhood licensing quality measures to adhere to, they often do not go far enough to help improve the overall quality. Subsequently, all areas of the

program suffer, including the curriculum that is often inconsistent across programs. The preschool director has so much influence that he or she requires a dual background in both early childhood and environmental education. A highly qualified director can provide more effective teacher training, as well.

The following list is a cursory attempt to put together a set of standards or high quality practices that have come out of my analysis of the data collected during this research and the existing literature in this field of inquiry. This is by no means a complete list, but meant only as a starting point for discussing the elements that should be included.

1. The central organizing principle of the curriculum is nature, based on local, seasonal, and natural occurrences.
2. The program is based on high quality practices of early childhood environmental education.
3. Nature is the main focus; academics are integrated in a meaningful way in the context of reality.
4. The curriculum focuses on environmental concepts and authentic experiences.
5. The director and teachers are educated and trained in both early childhood and environmental education and have a working knowledge of quality standards in both.
6. Nature center resources are a planned part of the preschool program.
7. Programs put a priority on nature by spending at least half their time outside, including both playing in natural play areas and hiking in diverse natural habitats.
8. Child initiated nature play is fostered, enabling children to know a place deeply and develop a sense of place.

9. Intentional teaching approaches are used.
10. Teachers give children time to explore the natural world and ask questions in order to problem solve and figure things out.
11. Exploration is a key ingredient of the program.
12. The physical space indoors is infused with nature and the outside contains natural play areas and diverse habitats providing opportunities to explore in “wild nature.”

The fifth and final major finding is that nature preschool directors often feel isolated from traditional preschools because their nature-based approach to early childhood education is uncommon. However, they also feel that this approach is worthy of sharing with other programs. A conclusion to be drawn from this is that there is a need to develop a network of nature preschools to be able to share experiences and challenges with each other and to share the nature preschool approach with educators at traditional preschool programs. Nature preschools offer unique approaches for educating young children that may be beneficial to traditional preschool programs. And the age appropriate practices may be beneficial to naturalists that provide early childhood programs at nature centers.

Recommendations

This is a critical time for engaging children with nature. The following recommendations are based on the findings and conclusions of this study, as well as my experience in this area. The recommendations that follow are for (a) nature center based

preschools, (b) nature center directors, (b) the larger profession of early childhood environmental education, and (c) recommendations for further research.

Recommendations for Nature Center Based Preschools

1. Develop quality standards for nature center based preschools that include education and training requirements for staff, curriculum approaches and focus, time spent outside, physical space requirements both inside and outside, child initiated nature play, nature center resource allocations, and staff to child ratios.
2. Develop a program accreditation for nature center based preschools based on quality standards of early childhood environmental education and newly created standards of quality for nature center based preschools.
3. Find ways to learn from other nature preschools through communication in webinars, conferences, exchange programs, class pen pals, and joint workshops.
4. Work with local universities to bring their early childhood classes to observe the nature preschools and learn from the nature preschool staff.

Recommendations for Nature Center Directors

For nature center directors that already have a nature preschool at their site:

1. Intentionally allocate nature center resources to the nature preschools located at their site, such as naturalists assigned to specific classes on a regular basis, special programs, and wild spaces for nature play.
2. Provide competitive salaries to nature preschool staff that are in line with the rest of the nature center and other preschools of equal quality in the area.
3. Place a priority on staff development by providing funding and time for the nature preschool teachers to take part in early childhood and environmental workshops.

4. Hire qualified staff who are educated in early childhood and environmental education or have a working knowledge of high quality practices of early childhood environmental education.

For nature center directors who do not have a nature preschool at their site:

5. Consider establishing a nature preschool or partnering with early childhood programs to offer nature center resources to existing programs.

Recommendations for the ECEE Profession

1. Create an association or network of nature center based preschools where participants can meet and learn from each other through conferences, webinars, list serve, and other methods of communication. This organization should partner with existing organizations, such as the National Association for the Education of Young Children and the North American Association for Environmental Education.
2. Provide workshops (and study tours at existing nature preschools) for early childhood educators to learn the key understandings of environmental education and for environmental educators to learn the key understandings of early childhood education.
3. Recognize the innate need of children to connect to nature by redefining what is meant by the “whole child”. Add an environmental or biophilic domain of early childhood to the already recognized developmental domains of young children (social, emotional, cognitive, physical, aesthetic, and spiritual).
4. Create a dual degree program for preservice teachers and a certification or endorsement for existing teachers in early childhood environmental education at

universities and colleges. Internships, student teaching opportunities in nature preschools, and lab schools with a nature focus should be a part of this endeavor.

5. Amplify and strengthen the approach to nature and outdoor education in Developmentally Appropriate Practice.
6. Strengthen the professional literature in early childhood environmental education. (For example the new International Journal of Early Childhood Environmental Education that has been introduced by NAAEE.).

Recommendations for Further Research

Further studies should be conducted to enlarge the database of information about nature center based preschools including the following:

1. Based on the limitations of the current study, including the potential for researcher bias, a survey of a larger sample of nature preschool directors should be conducted to assess the extent to which the same or similar findings would be uncovered.
2. A study that looks at the priority that nature preschools place on their outdoor time. Comparing programs that start their day outside with those that start inside to determine if beginning outside allows children to stay outside longer. Also assess the quality of the children's outdoor time.
3. Longitudinal study that assesses the impact of nature center based preschools on the conservation values and developmental domains of the students that attend.

Researcher Reflections

As I reflect on this research project, I feel it necessary to comment on the process, people I've met, and nature preschools in general. The process has been a lengthy one, full of fits and starts, eventually culminating in a better understanding of nature center based preschools, their practices, and challenges. In choosing to execute this dissertation using a qualitative research approach, I was initially unprepared for the amount of data and the time commitment required to successfully complete this investigation. Several years later, I realize this approach served me well and has provided a deep understanding of nature center based preschools.

I am thankful for the opportunity to meet with nature preschool directors, teachers, some parents, and nature center directors. The desire of these dedicated professionals to share their methods and programs at the nature preschools in this study is a sign of the willingness of professionals in this field to learn from each other and to advocate for a valuable program.

I came upon the field of early childhood environmental education by chance twenty years ago, working as an educator at a nature center. Seeing young children blossom as they spent time in the natural world awakened my own memories of my preschool years exploring in the woods behind our house. What felt like the "hundred acre woods" when I was four years old, was only two blocks of a small forest that eventually was replaced with suburban row houses when I was in high school. But those beginnings led me here, and I know in my heart that all young children need those experiences. My path has been a journey full of learning; first about early childhood education and developmentally appropriate practices from preschool teachers, classes,

and professional networks; and second about the natural world through field guides, workshops, biology classes, and explorations with the children. This dissertation is the culmination of many years of study, practice, and investigation. Nature preschools represent the best of what early childhood education and environmental education has to offer and it is my hope to see these succeed as a model for the education of young children.

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Appendix A INFORMED CONSENT LETTER

IRB#

Identification of Project:

Nature Center Based Preschools: A Multiple Case Study

Purpose of the Research:

The purpose of this study is to learn how directors in a nature center based preschool fulfill their goals in teaching young children. Of specific research interest are the directors' goals for the program and curriculum, what informs the program and curriculum (such as preschool methodology, environmental education, mission of the nature center, theories of child development, brain research, etc.), and what impacts the program and curriculum (such as NCLB, kindergarten readiness, academics, parent expectations, director and teacher qualifications & experience, size & longevity of the preschool, nature center policies and expectations, etc.). You are invited to participate in the research because you are presently a director of a nature center based preschool.

Procedures:

Participation in this study will require approximately two hours of your time. You will be interviewed about the nature center based preschool that you currently direct. The interview will be audio taped with your permission and will take place at a mutually agreed upon time at your nature preschool site. You may be asked for additional information and clarification in a telephone call or follow up interview after the initial interview is reviewed.

Risks and/or Discomforts:

There are no known risks or discomforts associated with this research.

Benefits:

Although the study is not designed to help you personally, the information gained from this project will contribute to our knowledge of nature center based preschools and may inform best practices. You will also have the opportunity to reflect on the implementation of your goals for the program and curriculum through the interview process and through reading the finished dissertation. The information gained in this study may also be significant to nature center directors wishing to start nature preschools. We will make the results of this study available to interested research participants if you contact the researcher by email pbailie@wi.rr.com or telephone 262-242-9260 after May 2011.

Confidentiality:

Any information that could identify you will be kept strictly confidential. Audiotapes of each interview will be transcribed then immediately destroyed. The data will be stored in a locked cabinet in the researcher's office and will be seen only by the investigators only

during the study and for three years after the study is completed. After three years the data will be destroyed. When completed this data will be presented in journals in a manner that shows only summary results of finds with examples presented in disguised form. No individual programs or persons will be identified without participant's explicit permission.

Opportunity to Ask Questions:

You may ask any questions concerning this research and have those questions answered at any time, either before agreeing to participate or during the research. Or you may call the researchers at any time (Patti Bailie at 262-242-9260 or Carolyn Edwards at 402-472-1673) if you have questions. Sometimes study participants have questions or concerns about their rights. In that case you should call the University of Nebraska-Lincoln Institutional Review Board at (402) 472-6965.

Freedom to Withdraw:

You are free to decide not to participate in this study or to withdraw at any time without adversely affecting your relationship with the researchers or the University of Nebraska-Lincoln.

Consent, Right to Receive a Copy:

You are voluntarily making a decision whether or not to participate in this research study. Your signature certifies that you have decided to participate having read and understood the information presented. You will be given a copy of this consent form to keep.

_____ Check if you agree to be audio taped during the interview.

Signature of Participant:

Signature of Research Participant

Date

Name and Phone number of investigators

Patti Bailie
Principal Investigator
262-242-9260

Carolyn Pope Edwards
Secondary Investigator
402-472-1673

Appendix B INTERVIEW PROTOCOL

Thank you for agreeing to meet with me to discuss your nature preschool program and curriculum. I will be asking a series of semi-structured questions about your program goals, curriculum, teaching staff, parents, community, physical environment, and nature center. I may ask several follow up questions to better clarify your answers. Feel free to offer additional information or stories that you feel better describe your program and curriculum. I will be audio taping the interview so I won't have to take detailed notes and can concentrate on listening to your answers.

Program Goals

- What are the goals of your preschool program?
 - Follow up questions: Where do the goals come from? Who established them? Why are they important? If you did not set the goals, would you change them? Why?
- What do you hope children will take away from your program?
 - Follow up questions: What does that learning look like here (i.e. knowledge, skills, dispositions, learning how to learn, etc.)? Can you give an example of what that looks like? What habits are you instilling in students? Articulate what it means to teach children how to learn, especially in the out-of-doors.
- What do you think the program will accomplish for children?
 - Follow up questions: How will it transform your children? When it works well what does it look and feel like? When it doesn't go as well, as you would like, what does it look and feel like? What social emotional skills are you explicitly trying to foster?

Curriculum

- What type of curriculum is used?
 - Follow up questions: Why did you choose it? *If you wrote your own – Why did you write your own?*
- Are there focused curriculum activities involving the areas of math, literacy, and science? *Pose this question by talking about other preschools and how they focus on math, literacy, and science and ask how they address these in their preschool.* In some preschool programs the focus on math, literacy, and science include a number of the week, letter of the week, and science table. How is your program the same or different from other preschool programs? Please use examples, if possible.
- *While looking at samples of children's work and/or activities, ask directors, Why are the children doing (what they are doing)?*

- What dispositions do you try to foster in young children?
- Please share any stories about the kinds of things the children do when they are outside in the natural world?
 - Follow up questions: Is cooperation or competition more prevalent?
- What type of problem solving occurs in your classroom?
 - Follow up questions: Is problem solving encouraged? If so, how? Please give examples.

Teachers

- How do you communicate the program goals to your preschool teachers?
 - Follow up questions: What issues do you see in translating the vision in your program to your preschool teachers? What are the difficulties in implementing the program goals?
- What are the qualities and dispositions of an excellent nature preschool teacher?
 - Follow up questions: How do you nurture these qualities and dispositions?
- What are the skills and knowledge of an excellent nature preschool teacher?
 - What training is most important for nature preschool teachers?

Parents

- How do you communicate your program goals to the preschool parents?
 - Follow up questions: What issues do you see in translating your vision to the preschool parents? How and what do you communicate with parents? What kind of thorny discussions have you had with parents in the last year? (*Do the directors talk about the children or parents first or as a package?*)

Community

- Do you interact with other preschool directors in your community?
 - Follow up questions: If so, how? What issues do you see in translating the nature curriculum focus in your program to the surrounding community?
- How does your surrounding community view your preschool?
 - Follow up questions: Is it supportive?

Physical Environment

- Describe the classrooms in your preschool? Does the physical space provide what you need for achieving the program goals?
 - Follow up questions: If so, why? If not, why not? What would you change?
- Describe the outdoor area that the children use. Does it provide what you need for achieving the program goals?

- Follow up questions: If so, why? If not, why not? What would you change if you could?

Nature Center

- Describe your preschool's relationship with the rest of the nature center. How does the nature center support your program? How does it hinder your program? Please give examples.
- What would be your ideal relationship with the rest of the nature center? Is this what you have? If not, how could you change it to be ideal?

Director background

- Tell me about your background and influences.
 - Follow up questions: What's embedded in your life story that makes you want to direct a nature preschool?

Ask for examples as much as possible when asking the questions. Leave enough liberty in each question to wander a bit for unstructured things that may come up.

Logistical Information

Background information about the preschool will be researched prior to the visit. Data will come from the nature center based preschool survey (Bailie, Bartee, & Oltman, 2008) and preschool websites. Information such as how many classes there are, the number of children per class, how often they meet and for how long will be confirmed during the visit.

Appendix C MERGED FINDINGS

The following are the merged findings and the individual findings that informed each merged finding.

Merged Finding I – Early Childhood Environmental Education Integration

The integration of early childhood and environmental education goals happen daily through exposure to nature (dissolving fears), awareness of nature (empowering children to act with an environmental ethic), being quiet on the trail in order to see wildlife (developing self regulation skills), spending time in a living classroom (fostering a child's sense of place), and engagement in finding and feeding local animals (developing empathy).

Individual Findings

- The children are actively engaged in finding and feeding the animals in the classroom.
- The program fosters a child's sense of place in a living classroom.
- Self control and self regulation develops from having to be quiet outside to see wildlife, not picking flowers or collecting things and giving reasons why.
- Fear dissolved with exposure to nature.
- Awareness of nature empowers children to act with an environmental ethic.

Merged Finding II – Teaching Staff Experience and Training

The combination of early childhood and environmental education experience, education, and training of the teaching staff have an effect on the quality of the preschool programs.

Individual Findings

- The director/teacher has an environmental education background and is a life-long learner. The teacher has an early childhood background. They work well together and learn from each other.
- Combining early childhood and environmental education is more powerful than each by themselves.
- The most important thing is to have the right staff who understand it (combining nature and child development) at their core.
- It is important to have a teaching team with diverse backgrounds who learn from each other.
- The backgrounds of the teachers impact the program (i.e. less developmentally appropriate and more cognitive on the trails).
- The teachers are highly educated (two in early childhood and one in natural science). Professional development is encouraged.
- The teacher who started the program is key to the program. She developed the curriculum through years of experience teaching preschool and paying attention to children and how they learn. Doing things that interest them, which is doing things in the natural world.
- There is no training for preschool teachers.

- College degrees are not a requirement for preschool teachers. Environmental education is not an important characteristic for preschool teachers.
- The preschool was started by an early childhood teacher working with an environmental education teacher. The environmental education teacher established study units and the early childhood teacher established schedule of the day.

Merged Finding III – Role of Director

The preschool director's background (early childhood and/or environmental education), qualities (life-long learner, resourceful, honest, tenacious), goals (personal mission of protecting the earth), and relationship to the nature center set the tone for the preschool program. Many of the preschool director's are champions of the preschool.

Individual Findings

- The program exists because of the qualities and background of the director which are life-long learner, goal oriented, resourceful, tenacious, honest and an early childhood and environmental education background.
- The director's relationship to the nature center is an integral part of recruiting children for the preschool (she teaches the feeder programs).
- Director's background is environmental education and she is a life-long learner.
- Director controls the whole program. Other teachers can give input within her structure. Program is "her baby".
- The director is invested and has a personal mission of protecting the earth.

Merged Finding IV – Role of the Nature Center

The nature centers offer unique resources for the preschools including natural play areas, farm chores, wildlife visits, diverse habitats, greenhouse, aviary, apiary, orchard, cider mill, gardens, sugarhouse, collections of natural materials and artifacts, outdoor animal exhibits, and naturalists. Some preschools have a seamless relationship with their nature center that enables them to share their program with visiting educators.

Individual Findings

- The uniqueness of the program includes natural play areas. Traditional programs could do the same thing. Nature preschools need to share this approach and help others have this type of program.
- Relationship of preschool and nature center is seamless. The preschool is a program of the nature center.
- The nature center grounds are considered a living laboratory.
- Uniqueness of the program is the exploration component, the farm chores and the wildlife visits.
- Being part of Mass Audubon has enabled them to share the nature based preschool program with visiting educators.
- The uniqueness of being at a nature center includes the 40 acres of diverse habitats, greenhouse, aviary, apiary, orchard, cider mill, gardens, and sugarhouse.

It also includes the nature buddies – naturalists that are assigned to each classroom.

- Unique features being at a nature center include numerous collections of natural materials and artifacts used with each study unit. It also includes diverse habitats, outdoor animal exhibits, and nature explore classroom.
- Naturalists are not a scheduled part of the preschool program.

Merged Finding V – Nature Preschool Curriculum

Because of the nature focus, the curriculum in most of the programs follows the seasons, is emergent, child directed, academically integrated, provides authentic experiences that involve risk, encourage problem solving, and opportunities to learn about environmental concepts. Many of the programs have no written curriculum.

Individual Findings

- The focus on the dynamic and constantly changing natural world enables the curriculum to be emergent, child directed, integrated, flexible, and developmentally appropriate for child development goals.
- Nature provides authentic experiences that involve risk, encourage problem solving, and opportunities to learn about lifecycles and other environmental concepts.
- Academics are integrated into the nature program.
- There is no written curriculum.
- Curriculum is child centered, follows the seasons, provides authentic experiences in nature, and is emergent due to the changeable natural world.
- No written curriculum.
- Curriculum follows the seasons, is emergent, flexible, and integrates academic skills within themes.
- The curriculum is whatever is happening each day the child is here. Nature enables the curriculum to be emergent.
- No written curriculum. Hard to pass down to new teachers. New teachers are often parents of children in the program so they understand the program due to required volunteering in preschool (coop).
- Children learn academics in the context of reality.

Merged Finding VI – Intentional Teaching Approaches

Intentional teaching approaches include creating a sense of community, inquiry based teaching, Nurtured Heart approach to discipline, open ended art based on authentic experiences, puppets, and a project approach based on collections, themes, in depth investigation of nature or different habitats, and the Montessori approach. Teachers give children time to figure things out.

Individual Findings

- Teachers give children time to figure things out.
- The teachers method of working with themes is more of a project approach, an in depth investigation.
- Intentional teaching methods include Nurtured Heart approach to discipline.

- Children are “generous towards each other”, more creative and confident with open ended art approach.
- Uses project approach with small groups that supports intellectual capacities.
- Puppets are used as a powerful teaching tool.
- Teachers use a Montessori approach for teaching skills inside, however other elements are added such as worksheets and crafts. Not integrated into nature topics completely.
- Developing a sense of community is intentional in everything they do.
- Intentional teaching methods include creating a sense of community and inquiry based teaching.
- The program is art project focused. Art projects develop and practice skills. They work with older children but often require a lot of adult supervision and help for the younger children.
- Each unit of study is approached in a project approach, an in depth study each month.
- Open ended art is stressed and based on authentic experiences.
- The director feels that there should be more of a project approach in teaching the children due to the nature curriculum. However this is not apparent.
- Curriculum revolves around study units every two weeks. Could be a project approach (nature and science study units).

Merged Finding VII – Outdoor Time

Programs that start their day outside value outdoor time more than those that end their day outside. In some programs, art projects take priority over outdoor time. Time spent outdoors varies by program with some supporting nature play, exploration, and child-initiated activities.

Individual Findings

- The outdoor physical environment allows children opportunities to explore diverse habitats and risk taking in a natural playscape.
- Outdoor time includes destinations with loose parts where children work cooperatively to build structures (nature play).
- They begin their day outside which gives a priority that nature is important.
- Unstructured time outdoors is most important part of their program. Everyone felt comfortable there.
- There seems to be a separation between inside time and outside time. Their goals seem to be different (academic inside and lack of nature materials to use inside).
- Children start their day outside giving the outdoor time priority.
- The art projects take priority over outdoor time.
- Child initiated activities mostly happen outdoors.
- Outdoor time is not a priority and occurs at the end of the day.

Merged Finding VIII – Influence of Physical Space

The physical space dictates the program elements by being more or less structured, allowing for or not allowing for quality early childhood classroom elements, having or not having dedicated space, including or not including local animals.

Individual Findings

- The indoor physical environment is flexible, hand made, includes local animals and natural materials.
- The nature center constraints impact the program by not allowing the preschool to have a dedicated space.
- The space dictates the program: inside and fenced in area is more structured, natural play area is unstructured nature play.
- The children call the outdoor area of the renovated house the “backyard”. This backyard, unstructured play in nature is missing from many children’s lives.
- Physical space was not built as a preschool and lacks necessary classroom elements.

Merged Finding IX – Parents

Parent education of the importance of nature experiences for young children is stressed in some nature preschools, however without this knowledge parents influence the addition of academic goals that are not DAP in other programs.

Individual Findings

- Parent education is important.
- Parents influenced the addition of academic goals in Pre-K program.

Special Finding I

The program is based on research.

Individual Findings

- The program is based on research in early childhood and environmental education.

Appendix D NATURE CENTER RESOURCES

Cases	Animals	Maple sugaring	Cider Mill/Press	Gardens	Apiary	Artifacts	Diverse habitats	Naturalists
A	Local animals found by the children.			X		X	X	Teacher is naturalist
B	Guinea pigs, wood frog tadpoles & one that emerged as a wood frog, egg incubator w/eggs	X	X			X	X	3 rd Teacher is naturalist
C	Nature center animals and finding local animals	X		X		X	X	Teacher is naturalist and access to others
D	Guinea pigs, box turtle, toad, fish, slider turtle	X		X		X	X	Regularly scheduled
E	Farm animals & wildlife visits	X		X		X	X	Regularly scheduled
F	Catching local frogs & turtles			X		X	X	Occasional naturalist programs, interns
G	50 different teaching animals	X	X	X	X	X	X	Regularly scheduled, 2 teachers are naturalists
H	Outdoor animals exhibits			X		X	X	Substitute and occasional visits

Appendix E NATURE PRESCHOOL GOAL STATEMENTS

Cases	Source	Goal Statements
A	Handbook	The nature preschool “was established to provide quality, loving care and a fun and enriching environment for children ages three to five years. The staff recognizes the importance of balanced growth so they provide opportunities for mental, social, physical, academic and emotional growth through a variety of hands-on and developmentally appropriate activities, both in the classroom and outdoors” (p. 1).
B	Handbook	The nature preschool “was founded...on the premise that happy and rewarding early childhood experiences with nature form the foundation for the development of creative, caring, and aware adults. Children enrolled...are provided with a continuing and meaningful relationship with the natural world. The school uses the natural world as theme and material in the education of the whole child...Our goal is to foster the child’s ability to work both independently and cooperatively, and to act in a caring and responsible way towards their environment, themselves, and others” (p. 8).
C	Handbook	“The mission of the Nature Preschool is to provide a premier early childhood environment which meets the developmental needs of the whole child, while initiating them into a lifelong, meaningful relationship with the natural world” (p. 2).
D	Handbook	“Our preschool aims to foster the growth of whole, well-rounded, happy children, and to inspire an appreciation for the natural world and a lifetime environmental ethic...[the nature center’s] 350-acre sanctuary serves as a living classroom for our preschool” (p. 1).
E	Handbook	“Philosophy is rooted in the idea, that just as the cycles of nature are evolutionary, steady and unhurried...so shall the education of young children...We foster the healthy growth of the ‘whole child’...By fostering a child’s ‘sense of place’, inside and outside the classroom, we can encourage care, respect, and responsibility towards themselves and each other, as well as the surrounding communities and ecosystems. Such a reverence and respect for life cannot be more powerfully taught than in a ‘living classroom’.” (p. 4)
F	Handbook	“Our goal is to make learning fun and to help develop your child’s natural curiosity...developing our curriculum to make sure your preschooler will be ready to go to kindergarten...They will learn the needed skills while studying about wetlands and insects and traveling to oceans and the rainforest to name just a few of our fun units” (p. 1).
G	Handbook	“This unique preschool accomplishes environmental education goals while addressing the whole child’s developmental needs” (p. 1).
H	Brochure	“The staff at the Nature Center Preschool is deeply committed to our natural world, to active learning, and to fostering each child’s strengths and potential for growth...Our [preschool] program is based on the conviction that children learn by doing...This [Pre-K] program is designed to support your child’s transition from preschool to kindergarten.”

Appendix F DATA SUMMARY TABLES FOR RESEARCH QUESTION FIVE

Finding 10.

Preschool director's education and background.

Cases	ECE	EE	Other	Influences	Qualities of director
A	ECE associates degree	Bachelors in Wildlife management	Nursing for 35 yrs, Head of NW OH LNCI movement	Grew up playing outside Richard Louv's book Mother of five children	Life-long learner Goal oriented Honest, tenacious
B	Elem Educ Taught 4 th grade	Natural resource studies in undergrad	Taught camps at nature center	Works with co-teacher with background in ECE	Self-learner (birds, butterflies, caterpillars, insects, wildflowers)
C	MA – some ECE courses.	BA Natural Resources MA Parks & Rec	Master's project – proposal for nature preschool.	Grew up on an organic farm with family of biologists	Life-long learner
D	Montessori	BA Env. Science, MA Oceanography		David Sobel Waldkindergartens Grew up playing outside	Visionary, hard worker
E	MA in early childhood			Grew up playing outdoors	Personal mission of saving the earth
F (D)			Administrator	Kids went through program – others have opportunity	Driving force, visionary, fund raiser
F (T)	Elementary Education Taught 1 st -3 rd , grades			Grew up playing outside Volunteering in daughter's preschool class	Creative, artist, developed program and curriculum
G	MA Bank Street		BA Home Economics	Helping in son's preschool class	Understand DAP
H	BA Elem Educ Taught K-1 st grade			Co-teacher who was a naturalist was her mentor	Nature center director was driving force and started the program

Finding 10.

Nature center mission and resources.

Cases	Reporting	Connection to NC	NC Mission	Location	Comments
A	Park district director	Good relationship as the preschool director is the education director for the park system		Same building	Feeder programs to the preschool include monthly toddler and preschool programs. The park director trusts the preschool director. She has a lot of autonomy, but no budget.
B	Director of education	Relationship has improved	connected	Same building	Lack of communication between preschool and NC, decisions made w/o staff input
C	Nature center director	Good relationship with nature center – preschool dir is ed dir of the NC	connected	Separate building	Overlapping staff
D	Director of education	Preschool is considered an educational program of the NC	overarching	Separate building	Preschool grew out of existing early childhood programs run by the NC – mom and babies, toddler program, six-week preschool programs, summer camps.
E	Director of education	Seamless relationship with nature center	overarching	Same building & separate building	Preschool grew out of existing early childhood programming that the nature center provided.
F	Parent board	Parent cooperative – run by the parents, follows rules of National Park	Not a part of the preschool	Separate building	Lead teacher started program, not the NPS, but Park superintendent was supportive in finding a place for the program.
G	Nature center director	Relationship is OK	connected	Separate building	Center supports preschool peripherally. Parents and staff tend to feel separate.
H	Nature center director	Good relationship	connected	Same building	Preschool director feels supported by nature center director.

Finding 10.

Philosophy of Education.

Case	Philosophy/Curriculum	Comments
A	Reggio Inspired	No budget so a lot of hand made things.
B	Nurtured Heart	Discipline approach
C	Creative Curriculum	Basis of program with nature focus added. Informed classroom design and length of class time
D	Montessori	Director is Montessori trained. Montessori method is used during indoor time with Montessori materials and approach, but nature focus tends to be more during outside time.
E	Community	Building a sense of community is intentional and informs the daily activities and schedule where things are done together.
F	Art Focused	Art focus within themes informs the program requiring labor intensive work for the teachers. Projects are teacher driven and product oriented. Rationale is that they provide opportunities to practice skills. Not always DAP. Even snacks are based on themes, but not always nutritional.
G	Bank Street, DAP & open ended art	These are the director's focus, but feels that the teachers are not always providing this. Nature focus is primary, but director feels that not all the teachers are outside enough or focused on the natural world when they are.
H	Elementary education	Elementary education background of the teacher informs the program activities and schedule of the class

Appendix G DATA SUMMARY TABLES for RESEARCH QUESTION SIX

Finding 11. Physical space, parent expectations, art project focus, nature center policies and procedures, focus on academics.

Cases	Physical Space Inside	Physical Space Outside
A	Renovated maintenance bldg/shared space	No fenced in play area. Natural playscape for nature play
B	Renovated garage	No fenced in play area. Has areas for nature play on NC grounds
C	New building for preschool	Two fenced in play areas
D	Renovated house	Fenced in area w/trad. play equip, and natural non fenced playscape
E	Renovated house and shared room at NC	No fenced in play area. Grassy area outside NC. Backyard outside house.
F	Renovated barn and house	No fenced in play area. Backyard of house, nature play outside barn
G	Renovated stables and new annex bldg.	Courtyard by classes, fenced in natural play area outside annex
H	Multiuse rooms, not designed for preschool	No fenced in play area. Nature explore outdoor classroom on NC site

Cases	Parent Expectations	Product based projects	Nature center policies & procedures	Focus on Academics (Kindergarten Readiness)
A	Value the outdoors			
B	Go out every day	Has changed from this	Lack of communication	Kids are ready
C	Parent education			Community discussion
D	Changed over time	Tends to be		Children are empowered
E	Appreciate outdoors		Influenced by environmental org.	State's quality rating sys.
F	Not a fit for everyone	Impacts outdoor time	Park service not helpful - budget	Activity based assessment
G	Low key/down to earth	Sometimes	Outreach canceled	Kids are ready
H	Influenced including more academics	Impacts outdoor time	No regularly scheduled naturalists	Show and tell impacts outdoor time

Finding 12. Teacher backgrounds.

Cases	ECE	EE	Other	Education level	Comments
A					Assistant teacher is a parent
B	1 ECE	1 EE & Knolls training		Most have 4 yr degrees	EC educator influenced by Bev Bos
C	4 ECE	Recreation, general science	Elementary education	4 yr degrees	
D	Child care	Science	Psychology	Most do not have 4 yr. degrees	Encourages trainings
E	ECE	Science		MA & BS	
F	2 ECE		1 kindergarten	Some have 4 yr degrees	Many are nature preschool parents
G	Some ECE	Some EE		Many do not have 4 yr. degrees	Not life long learners
H			Elementary educ	Many do not have 4 yr degrees	One is a retired teacher There is minimal training

Finding 13. Written curriculum.

Case	Curriculum	Comments
A	Not written	Created by the director
B	Not written	Since old director left, teachers meet weekly to plan.
C	Creative Curriculum	CC sets up the environment and the basic structure of the day. Also encourages project approach, long term studies. Added nature focus within environment and activities and added outdoor excursions (hikes in different habitats).
D	Montessori focus	Montessori focus inside, not connected to outside time.
E	Not written	Pull from different resources, but may develop their own curriculum
F	Not written	Difficult to pass on to new teachers
G	Not written	Put together notebook with nature activities
H		Two years of units generally based on collections

Appendix H DATA SUMMARY TABLE for RESEARCH QUESTION SEVEN

Finding 14. Directors' activities in the larger field of teaching and learning.

Cases	Sharing w/preschools	Feedback on NP students	Network of NP
A	Workshops for other preschool teachers	Special needs student	Head of NCLB group in her area
B		Knowledgeable about science and nature. Mixed age group helps the children to be at the top of their class.	Was involved in a local preschool director network, but nature preschool was very different so not a fit.
C	Higher goal of sharing nature approach	Confidence and literacy	Would like a network of nature preschools
D	Interested in publishing a curriculum	Children expect to go on hikes at kindergarten	Communicates with local programs, would like a network of nature preschools
E	Workshops and curriculum boxes		Not involved in local network because nature preschool is "out of the box"
F	Preschool workshops through learning center	Children ask questions	
G	Director teaches at local community college	Ready for kindergarten in all aspects and do well.	Involved in network of local preschools, would like a network of nature preschools
H	Collaborative program with public schools	Respect nature and want to be outside	

Appendix I INCORPORATING ELEMENTS OF QUALITY PRACTICE

Nature preschool practice	Approach	Outcomes
Nature play and hiking in the natural world, farm chores, wildlife visits, collections	Project approach	In-depth investigations, Birthdathon, trapping animals, building fairy houses, investigation of insects, farm and wild animal investigations
Nature center resources, safety, priority on being outside	Intentional teaching methods	Nurtured Heart approach to discipline, puppets, sense of community, inquiry-based, starting outside, art based, using collections for study units, Montessori Method.
Hiking in diverse habitats, nature play, exposure to animals and plants, natural materials in art area	Open-ended art based on authentic experiences	More creative, less stress, painting snakes out of catalpa seed pods, recycled art, painting wildflowers
Seasonal themes, nature play and hiking in the natural world, collections, nature activities	Integrated curriculum	Lining up nests by size, meaningful experiences and knowledge, practice skills within themes, part of their daily lives, academics just happen through nature activities
Animals in the classroom, finding animals outside, nature center resources	Engagement with animals	Finding and feeding local animals, raising frogs, farm chores, wildlife visits, teaching animals, catching turtles and frogs